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Improved Mode of Lining Oil Barrels.

It is well known that petroleum, from the facility with which it passes through capillary tubes—as the pores of wood, for instance—is one of the most difficult substances to confine so as to avoid loss. Inventors have sought, in all directions, for some efficient plan to prevent oil from escaping, and many plans are in use at the present time to effect the object. Aside from the loss sustained by the oil exuding, great danger of fire exists from the explosive nature of its gas.

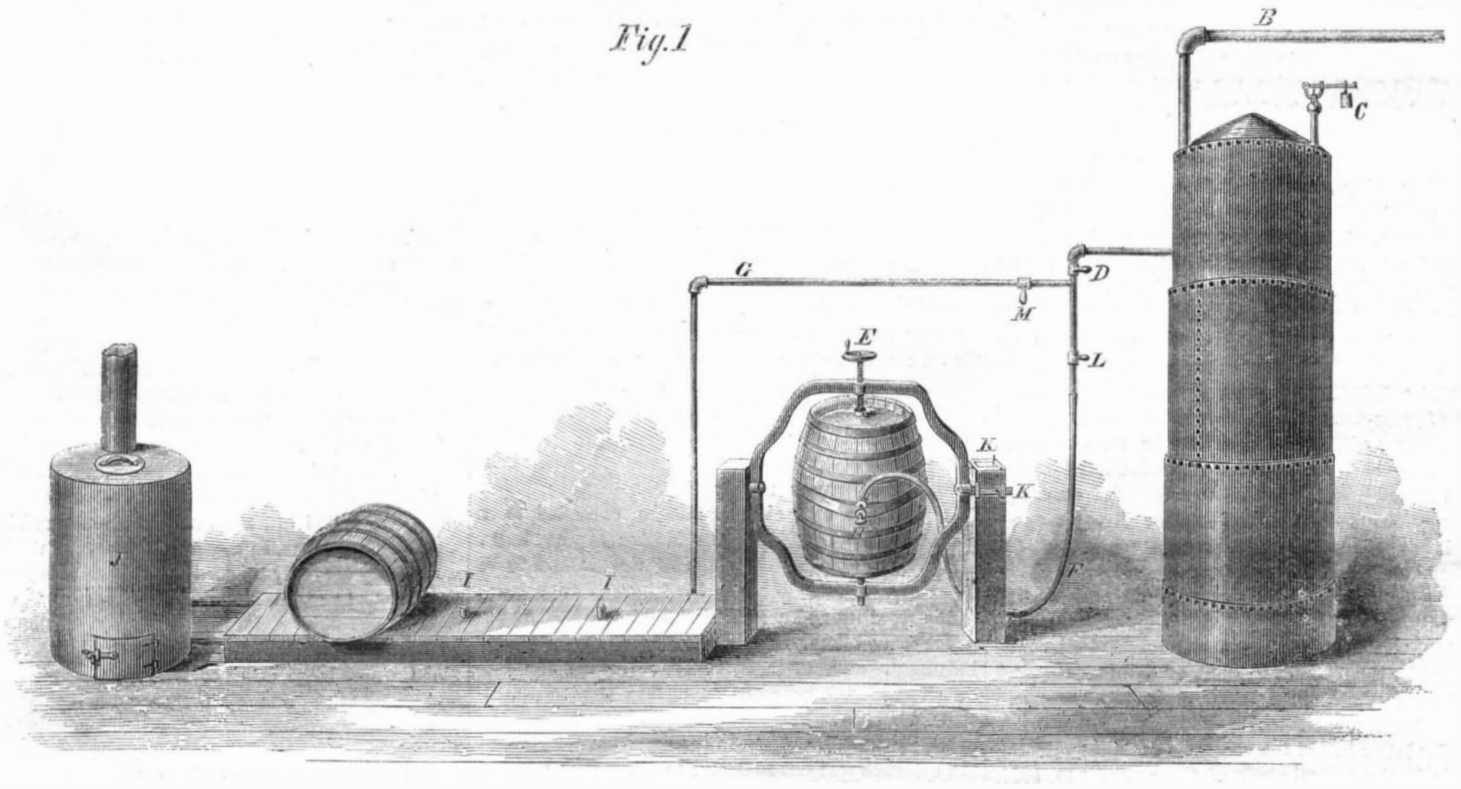
We present herewith full engravings of a new plan for lining or forcing any approved composition into the pores of wooden oil barrels, so that the same may be rendered absolutely impervious.

The plan consists in heating barrels to the proper temperature, so as to open the pores of the wood and drive out the water; then putting in the composition, agitating the barrel, and, finally, admitting compressed air to force said composition into the barrel.

The details, as shown in the engravings, are as follows:—

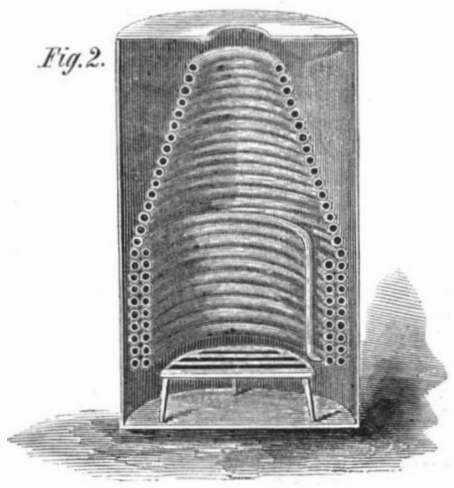
A is an air tank, that may be made of iron or wood of sufficient strength to sustain a pressure of 30 lbs. to the square inch, and hold 200 gallons. B is a two-inch iron pipe leading from an air pump, not shown, that may be driven by steam, water or other power. C is a safety valve set at any pressure it may be desired to put upon the barrel—say twenty-five pounds to the square inch. D and L are stop cocks in the pipe leading from the air tank to the barrel. F is a three-quarter-inch hose connecting the air pipe with the barrel. H is a set screw passing through a movable iron hoop and pressing upon the staves; a flange, covered with a thick rubber washer, attached to a short section of iron pipe to which the hose is connected, allows the compressed air to enter without leakage. E is a set screw, connected with an iron plate, so arranged as to revolve on the end of the screw; a corresponding plate and stationary screw being at the opposite end of the barrel, allowing it to be easily rolled on these two centers. The iron frame, through which these screws pass, is suspended between two ports or iron bolts, so that the frame and barrel can be rotated in opposite directions. G is an iron pipe, one inch in diameter, leading from the tank to the scroll in which the air is heated. I is the sheet-iron case for the scroll. J J are short pipes connected with a horizontal pipe, passing under the platform on which the barrels are placed for heating, an end of which is connected with the scroll, and the pipe, G, is joined to the other end of the scroll. K K are iron clutches for holding the iron frame in a vertical or horizontal position.

Fig. 1



WOODRUFF'S PLAN FOR LINING OIL BARRELS.

Fig. 2.



These are the details, and the operation of them has been previously described. Fig. 2 shows the arrangement of the air heater, J. Three barrels are operated on at once, they being ready in about the same time that the last operation is completed in the frame—that of applying the compressed air.

This plan has been thoroughly tested, and is not made public as a scheme merely. We have seen some of the barrels so treated, and have no doubt of its practical value.

This invention was patented on July 4, and Oct. 24, 1865, by Jas. O. Woodruff. For further information address Edson & Co., Albany, N. Y., or C. M. Peck, No. 69 Liberty street, New York City.

THE STRENGTH OF CAST-IRON PILLARS.

We have received from the publisher, D. Van Nostrand, No. 192 Broadway, New York, a very neat book of 72 pages, on the Strength of Cast-iron Pillars, by James B. Francis, Civil Engineer. The first 25 pages are devoted to a history of the investigation of the subject, with an elaborate discussion of the experiments made by Hodgkinson and Fairbairn, and of the formulæ which were deduced from those experiments. The remainder of the book is filled with tables, giving the weight with which it is safe to load cylindrical cast-iron pillars of various dimensions, from 2 to 10 inches in diameter, from 8 to 30 feet in length, and with sides from $1\frac{1}{4}$ to 2 inches in thickness. Simple arithmetical rules are also given for computing from these tables the safe weights for solid, triangular, and rectangular pillars of cast iron, for pillars of various forms of cast steel, Dantzic oak, American white oak, red deal, and white pine.

This brief statement of its contents will show, better than any commendation of ours, that this little work must be of very great value and convenience to all manufacturers of pillars, and to all engineers, architects, and builders who may have occasion to use them.

BAYARD TAYLOR has introduced a new watermelon which keeps through the winter. He obtained the seed on the Volga, Russia, from a melon grown in Persia, on the shore of the Caspian Sea.

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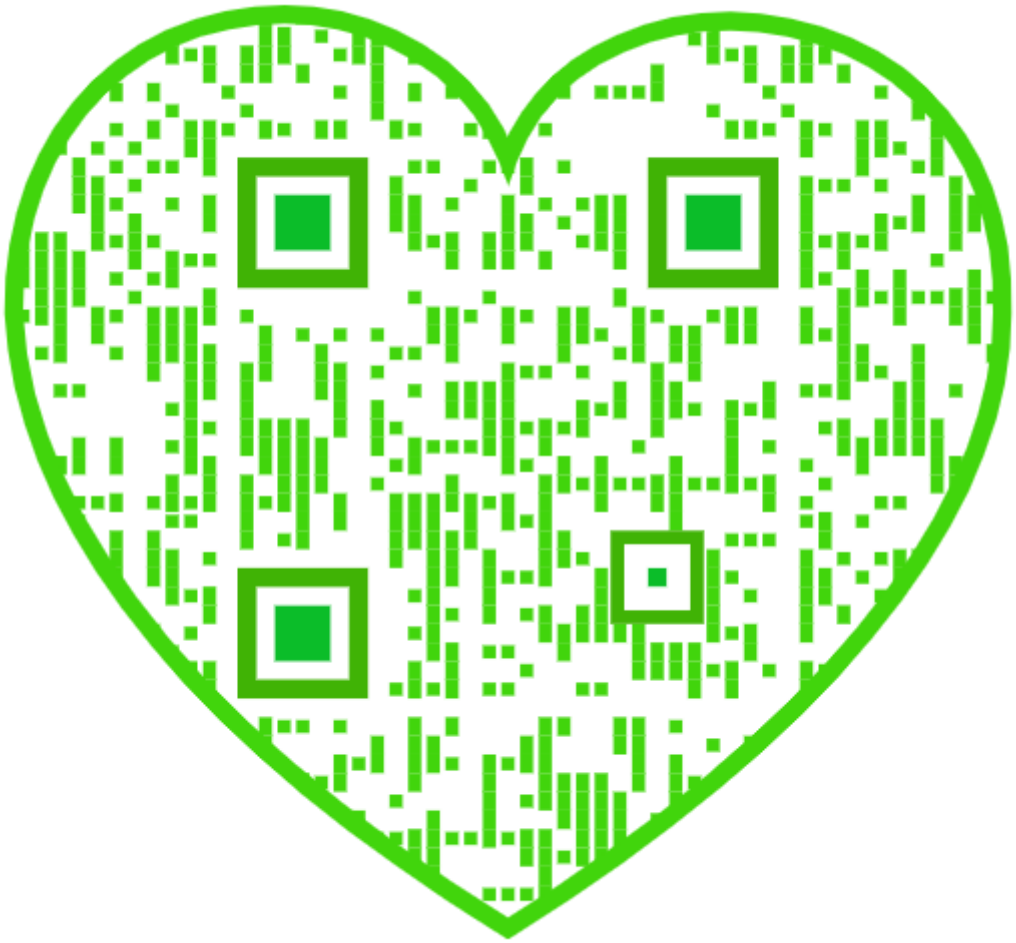

SMITHSONIAN REPORT.

We are indebted to Professor Joseph Henry, Secretary of the Smithsonian Institution, for a copy of his report for 1864. The account of Professer Bache's magnetic observations is continued—the account closing with this remark:—

"From all the investigations on this subject up to the present time we may infer, first, that the earth is a great magnet, having a natural, and in one sense a permanent, polarity; second, that this polarity is disturbed in intensity and direction by the varying effect of the heat of the sun; third, that the magnetism of the earth is affected by that of the sun and moon; and, fourth, it is probable that magnetic polarity is common to all the bodies of the solar system."

This statement is made in regard to the reports:—

"The annual reports to Congress are printed at the expense of the Government as public documents, with the exception of the wood-cuts, which are furnished by the Institution; and it is gratifying to be able to state that for a number of years there has not been a dissenting vote in Congress on the adoption of the order to print the usual number of ten thousand extra copies of this work. The manuscript of the report for 1863 was unfortunately mislaid at the Capitol, and the public printer was therefore obliged to delay the publication on account of other more pressing demands of the departments of the Government. It is much to be regretted that at the recent fire at the Institution all the copies of the reports on hand for general distribution to individuals were destroyed, so that at present it will be impossible to supply the many applications which are made for copies of the back volumes of the series. The reports for 1861 and 1862 were stereotyped, and when the cost of press-work and paper is reduced to its normal state, a new edition of these may be struck off and disposed of at the mere price of production."

Storms are being subjected to a series of extensive and careful observations. Professor Henry says:—

"It has been mentioned in previous reports that the second volume of the results of meteorological observations made under the direction of the Smithsonian Institution and the Patent Office, from the year 1854 to 1859, was in press, and that its completion was delayed by the unusual amount of printing required by the necessities of the public service to be executed at the Government Printing Office.

"The latter half of the volume is occupied with materials for the critical study of three storms in 1859, one of which occurred in March, and the other two in September, collected from the records of the Institution, and prepared for publication by Professor J. H. Coffin, of Lafayette College, Easton, Pennsylvania. One of the important objects aimed at in establishing the meteorological observations of the Smithsonian Institution was the collection of data for the critical examination of the development and progress of the extended commotions of the atmosphere which occur during the autumn, winter, and spring, over the middle or temperate portions of North America. It is well known that two hypotheses as to the direction and progress of the wind in these storms have been advocated with an exhibition of feeling unusual in the discussion of a problem of a purely scientific character, and which, with sufficient available data, is readily susceptible of a definite solution. According to one hypothesis the motion of the air in these storms is gyratory; according to the other it is in right lines toward a central point, or toward an irregular elongated middle space. It is hoped that the data here given will be considered of importance in settling, at least approximately, these questions as to the general phenomena of American storms."

Compliment to Professor Page.

The Bankers and Brokers Telegraph Co. have tendered to Prof. Chas. G. Page, of the Patent Office, the use of their lines of telegraph as a tributeto the many inventions and discoveries he has made in electricity and magnetism and valuable contributions to the telegraphic art. Prof. Page has contributed many inventions in the application of electricity and magnetism, among which is the automatic circuit breaker and induction coil, so widely used for administering electricity as a remedial agent. He was also the first to introduce in the Morse telegraph a fine wire receiver magnet, and is also the inventor of the axial magnet, which has been used for many years as the mechanical motor in the House printing telegraph. The disturbance of the molecular forces by magnetism, the production of the thermo-electric spark, the vibration of Trevelyan's bars by galvanism, the curious phenomenon of presenting a piece of soft iron to the pole of a powerful magnet without any visible attraction, and many other developments of scientific interest recorded in *Silliman's Journal* entitle Prof. Page to a high rank among American inventors and philosophers.

Right of Joint Patentees---Important Decision.

The Lord Chancellor of England has recently decided an important case in the Court of Chancery, involving the rights of joint patentees on appeal from the decision of the Master of the Rolls.

It appeared from the case that the defendant, Thomas Green, had carried on business at Leeds as a manufacturing engineer, and was a maker in particular of lawn-mowing machines and rollers; and also had a retail shop in Victoria street, Holborn, which was managed by his son, Willoughby Green. In the latter part of the year 1861, Willoughby Green joined his father at Leeds as partner, when the London business was carried on by the plaintiff down to the year 1863. Letters Patent had been obtained in the joint names of the defendants and the plaintiff for improvements in the construction of lawn-mowing machines, etc., and the defendants had been in the habit of granting licenses and receiving royalties on the sale of the machines. In 1863, differences arose between the parties, when the plaintiff filed his bill for an account, claiming, as partner, a share in the royalties received by the defendants, and insisting upon his right to the profits of the London business, which, he alleged, was his own, although carried on in the name of the defendants. The defendants contended that he was merely their managing agent. The evidence and correspondence extended to a considerable length, and the Master of the Rolls, although negativing the claim of the plaintiff to be a partner, made a decree in his favor as to a share in the royalties and commission, and directed an account to be taken. The Lord Chancellor delivered judgment, and, after carefully reviewing the evidence and the correspondence, said that with respect to the first part of the case, namely, the claim of the plaintiff to a share in the royalties, he thought the evidence was not sufficient to rebut the assertion that the plaintiff was jointly interested with the defendants in the Letters Patent. This interest, however, could not confer upon him a right to claim a share in the profits made by his co-patentees, unless there was a special contract to that effect. The right under Letters Patent was to exclude all the world from the benefit derived from them except the grantees of the patent; but there was nothing in the law to restrict any of the joint patentees from such benefit. This could only be done by special contract, and, therefore, as none such existed in the present case, the claim of the plaintiff on this ground must be rejected, and the decree of the Master of the Rolls reversed. With respect to the second part of the case, the claim of the plaintiff to the profits of the London business, he, the Lord Chancellor, was of opinion that the evidence proved that the plaintiff was only the managing agent for the defendants, and he had consequently wholly failed in establishing any title for relief. The bill must be dismissed with costs.

Scientific Predictions of the Weather.

The daily record of meteorological observations telegraphed to the Imperial Observatory at Paris, and published in a lithographed sheet, continues to increase in interest and importance under the active and enlightened superintendence of M. Le Verrier, director of the observatory. From being the medium simply for the circulation of telegraphic notices of the weather, it has become, in addition, a repository of valuable meteorological summaries, communications, criticisms, and announcements. The outline chart of Europe, with the curves of equal barometric pressure and direction of the wind at the different stations on the day of publication, and also a table of the estimated weather for the following day, continue to be inserted in every number. The title of the publication is now "International Bulletin of the Imperial Observatory of Paris." It occupies more than twelve hundred folio pages yearly, at a subscription price of thirty-six francs.

The Institution has also received a similar meteorological bulletin from the Royal Observatory at Palermo. In the first number of this, a plan is proposed for distributing simultaneous meteorological observations similar to that which was adopted previous to the war by the Smithsonian Institution, viz: that of furnishing the most important telegraphic stations with meteorological instruments, and instructing the principal telegraphist, or one of his assistants, in the process of making observations. A thoroughly organized system of this kind over the whole United States, with a series of directions for predicting the weather at a given place from a knowledge of the condition of the atmosphere at distant points, would be of vast importance to the maritime and agricultural interests, particularly along the Atlantic sea board. It is hoped that as soon as order is restored and peace fully re-established throughout the southern portion of the United States, the system will be revived under still more favorable auspicies.—*Report of the Smithsonian Institute.*

Phosphate of Iron in Blood.

Mr. James Bruce says that the red particles in blood are caused by phosphate of iron, for by adding this preparation of iron to blood, or to the white of an egg beaten up with distilled water, a beautiful red color is produced. Mr. Bruce further states that its presence in the blood serves the purposes of heating and thinning it, promoting its intestine motion, as well as helping it through its passages (from its superior gravity) by increasing its weight and force against them, and, therefore, any obstruction in the glands or capillary vessels must sooner be removed by such metallic particles than by those which are lighter. Iron, he adds, is the only metal friendly to the human constitution; but its use, where iron medicines are called for, must not be persevered in for any length of time, as any large excess in the blood would only serve by its pressure against the sides of the vessels to cause internal hemorrhage. The last fact was evidenced in the treatment of the cattle plague, the excrements of the cows being mixed with blood, where large doses of iron were administered, and which is not one of the recognized symptoms of the epidemic.

Paper from Corn Husks.

At a recent meeting of the Institute of Technology, in Boston, Mr. Bond made a statement of results recently attained in this country and in Europe in the manufacture of paper from corn husks. Experiments upon this material have been in progress in Bohemia since 1854, but have not reached a satisfactory result until within the last two or three years. In the successful processes lately adopted the husks were boiled in an alkaline mixture, after which there remained a quantity of fiber mixed with gluten. The gluten was extracted by pressure, forming a nutritious article like "oil cake," and then the fiber was subjected to other processes in which it produced the real paper "stock" or "pulp," and left a fiber which has been made into strong and serviceable cloth. The husks yield 40 per cent of useful material; 10 per cent of fiber; 11 per cent of gluten, and 19 per cent of paper stock. This paper stock is equal to that made from the best linen rags. Allowing a profit of 38 per cent to the manufacturer—the different articles can be produced for 6 cents per pound for fiber, $1\frac{1}{2}$ cents for gluten, and 4 cents for paper stock.

VESSELS made of zinc should never be used for holding milk, as when milk is allowed to repose in contact with this metal a lactate of zinc is formed, as well as a compound of casein and oxide of zinc, both of which are extremely injurious if taken into the system. A solution of sugar, which stood a few hours in a zinc vessel, was found to contain a considerable quantity of salts of that metal.

GUN-COTTON can be exploded with the utmost certainty by dropping a fragment of sodium upon it; it is not necessary that any moisture should be present. The phenomenon has been attributed to the peculiar chemical action or influence known as catalysis.

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RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Improved Skate.—This invention relates to a new and improved fastening for skates to the soles of boots or shoes, without the use of straps, and it consists, principally, in dividing the foot-rest or support of the skate, in the direction of its length, into two parts or sections, which sections have, at suitable points of their length and upon their outer edges, raised studs or clamps, and are so arranged upon the supports therefor of the skate runner or blade, as to be susceptible of a lateral movement with regard to, and toward, each other, so that when the foot has been placed thereon, they can be brought through their raised studs or clamps, upon and against the sides of the boot or shoe sole, with any desired degree of pressure, and there held, thus firmly and tightly clamping or binding the boot or shoe sole and heel, between the same; the foot being released by simply unlocsening and withdrawing the two portions of the foot-rest from each other. John Lovatt, of No. 124 Summit street, Essex, N. J., is the inventor.

Steam Boiler.—This invention relates to a steam generator, the fire-box of which is surrounded by a water jacket extending all round. Suspended from the crown sheet of the fire-box is a cylinder which communicates with the water space of the boiler. The outside diameter of this cylinder is much smaller than the inside diameter of the fire-box, and the annular space thus formed in the fire-box is occupied by a series of pipes emanating from the lower part of said cylinder and terminating in its upper part, in such a manner that a very large heating surface is obtained, and the water is caused to circulate freely throughout the boiler. From the crown sheet of the fire-box rise a series of tubes through the upper part of the water space and through the steam space of the boiler, and by these means the heating surface of the boiler is still further increased, and the steam in the boiler is dried and partially superheated. James Connery, of Wilmington, Del., is the inventor.

Improved Lock.—This invention consists in combining with the sliding bolt and lock plate a small detachable case containing the mechanism for locking and unlocking, from which a false bolt projects, the head of which is provided with holes to drop over studs or pins in the inner end of the shank of the sliding bolt, in such a manner that not more than two holes are required in the lock plate to receive pins or rivets for the purpose of securing to the same, the case containing the mechanism for locking and unlocking, and the same case can be used for lock-plates of different size, nothing being necessary for different sized locks but to change the length of the shank of the sliding bolt. Rudolph Vollschwitz, No. 158 Elizabeth street, New York, is the inventor.

Coating Electrotype Plates.—In the method of making or casting stereotype plates, known as the clay process, a mold or matrix is first made by spreading a putty or composition of clay and other ingredients upon a metallic plate, as iron, and taking an impression of the type by pressing the mold upon it. In order to obtain a stereotype plate from this mold, the plate is heated till the mold is dry. A wire, bent to form three sides of a parallelogram, is then laid around the mold on the plate, another plate is placed on the top of the wire, and all are held firmly together by clamps or other device, and, being set on edge, the space between the plates, made by the wire, is filled with melted metal which, when properly cooled, forms the stereotype plates. The object of this invention is, first, to hold the plates firmly together in contact with the wire or other equivalent device; and, second, to facilitate the turning of the plates on edge at any desired inclination for casting; and, third, to allow the free application of water to the plates and flow of the same from them in the process of cooling. The invention consists of a frame having an open bed furnished with narrow or toothed bearings, whereby the desired end is attained. W. F Draper, of Andover, Mass., is the inventor.

Illuminating Public Clocks.—This invention relates to a new method of illuminating public clocks by which, among others, the following advantages are obtained—first, the time may be seen at a distance far greater than by the present mode, consequently their efficiency will be largely increased; second, their original cost will be much reduced, no expensive glass dials being needed; third, a great saving effected in the consumption of gas; and, 4th, an entire freedom from the danger of explosion—the gas being consumed only on the outside of the building. The invention consists in placing lights upon the hands or pointers of a clock instead of behinds the dials, as heretofore, and which is accomplished by making the spindles and sockets, that carry the hands, in part hollow, so that a stream of gas may be conveyed through said spindles and sockets to the center, and also to near the extremity of each hand, and terminating in small burners or jets. These jets are protected by means of a lantern or covering glazed with talc, horn, glass, or other suitable material, the center one being stained to show a colored light, so that it may be distinguished from the others, and the respective portions of the hand or pointer lights readily seen so as to indicate the time. In order to facilitate the cleaning or repairing of said lamps or jets, and also to provide for the freedom or inshake necessary in clock machinery, some portion of the tubes that convey the gas are constructed of india rubber or other flexible material. Thos. I. Bailey, Nashville, Tenn., is the inventor.

Coloring and Polishing Wood.—These improvements are embraced in two separate Letters Patent, one of which was issued upon the 28th day of November last, and relate to a novel mode of applying colors or coloring materials to wood, whereby at the same time an extremely beautiful and fine polished as well as colored surface i s imparted to it, greatly resembling in appearance the ordinary china and porcelain wares. The invention is particularly appropriate, not only in the manufacture of table and fancy ornaments of all kinds, but also in the decoration of furniture and the trimming of apartments or rooms of dwelling houses and other buildings. Edward Knabeschuch, of No. 121 Greene street, New York is the inventor.

Graduating Lubricator for Steam Engines.—The object of this invention is to produce a lubricator with few parts, constructed and arranged in a simple manner, and yet retaining the character of graduating the flow of oil so that the operator shall be able to control it, and also containing a feed opening independent of and separate from the valve stem. Among other advantages in operating the lubricator which are conferred by this invention is that the steam in the reservoir when it is opened is discharged in such a manner that the hand of the operator cannot be scalded; that the oil can be readily poured in; that the air can freely escape; that the reservoir cannot be filled without always leaving an air space at its top into which the steam will rush when the valve is raised and quickly equalize the pressure and allow the oil to discharge at the bottom, and that there are no cocks or valves opening externally at the bottom of the reservoir to leak or waste the oil, nor any air passages or snifting cock at top. Furthermore the apparatus can be made at a small cost. John Broughton, of No. 41 Center street, New York, is the inventor.

FOREIGN CORRESPONDENCE.

[For the Scientific American.]

The view which you take in your recent article regarding fairs and exhibitions as an advertising medium for manufacturers, is, in general, a correct one, but there are some considerations which I think you have overlooked. A universal exhibition, like the one to be held in 1867, serves a double purpose—comparison of the progress made in manufacturing by different nations in the same branches of industry, and a reliable test of their distinctive superiority. The profit that can be realized by the exhibitors is, in my opinion, but a secondary consideration compared with the satisfaction felt by one and all, as individuals or as a nation, at the recognition of our inventive and mechanical genius as compared with other countries. The rewards which are also given, when fairly and impartially bestowed, should be sought for by manufacturers as the soldier seeks the ribbon, which, on his breast, proclaims to the world some deed of daring by which he has rendered himself worthy of distinction and surpassed his fellows. So the medal of the great exhibition rewards the skill, invention or genius of the manufacturer who has surpassed his competitors and entitles him to at once become a member, if I may use the word, of the aristocracy of manufacturers. Throwing aside the probable pecuniary advantage which may occur to the manufacturer, is not the feeling of national pride sufficient to induce our mechanics and machine shops to send forward specimens of their workmanship, and prove to the world that, though we have carried on for four long years the greatest war of modern times, yet that we are still far ahead of all other nations in our agricultural and mechanical tools, and that the war, which would have crushed and paralyzed the energies of any other nation, has but quickened and stimulated our inventive genius and facility of production.

A long experience in the machine business in France has convinced me of the immense superiority possessed by our machinists over all continental countries, and even over England, and our advantages are so great and so marked that our principal manufacturers have but to send over specimens of their tools to carry off the palm.

Agricultural implements are also exceedingly imperfect, and even in such articles as shovels, picks, rakes, scythes, etc., France and Germany are, as a rule, fifty years behind us.

There are hundreds of articles in daily use with us, and so common as not to attract our notice, which would be appreciated, and the inventors rewarded, if only sent forward.

I would appeal then, through your widely circulated and valuable journal, to all our principal manufacturers to send forward samples of their products, and the insignificant expenses that may be incurred are but a trifle compared with the pride and gratification that every American will feel at seeing his country assigned the first rank among manufacturing nations.

In 1862, our American department elicited so many sneering remarks, and our poverty of exhibitors was so great, that every American felt that, the opportunity again recurring, it was his duty to do all in his power to restore us to our proper place. We were then engaged in, and pursuing with all our energies, the restoration of our glorious Union, and that our exhibitors were so few in number is hardly to be wondered at. But the great end has been bravely and nobly accomplished, and, now that the occasion is again offered, the hope of every American residing abroad is, that 1867 will avenge our miserable display in 1862.

That our clocks, porcelain teeth, and a few other articles only have found a good market here, arises from the fact that the attention of our manufactures has not been turned to the wide market that the continent offers. That a good demand would spring up for our lathes, our milling and digging machines our patent chucks, our agricultural implements, etc., I am confident of from my own experience. I have refused hundreds of times to sell my own tools at a price which would have left me a very large profit, and no better speculation could be engaged in, than depots of American tools in all the large cities.

The exhibition of 1867 differs from all others from the fact that each exhibitor is allowed to ticket his articles, and make sales and take orders during the whole duration of the exhibition. I would appeal then to all our leading manufacturers to send forward samples of their products, and they may rest assured that they will not only have the proud satisfaction of obtaining the first place for our country, but will also open new markets, which, up to the present time, have been neglected. CHAS. R. GOODWIN.

Paris, November, 1865.

REFERRING to recent observations in our colums on the waterproofing power of paraffine, "A Policeman" inquires the proportion in which it must be mixed with other substances, to render boots or shoes waterproof. Perhaps some of our reader will kindly supply the information; pending which we offer the following:—Melt together ½ pint of boiled linseed oil, 2 oz. of suet, ½ oz. of bees wax, and ½ oz. of resin. We have found this most useful in rendering shooting boots impervious to wet.—*Mechanics' Magazine.*

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THE FOOT LATHE.

Number 2.

Any one who has watched a novice at work on a lathe, must have remarked the difficulty he has in controlling the tool and keeping up the motion of the treadle at the same time. The two operations are difficult to "get the hang of," to use a homely phrase; but once conquered, the work can proceed. The natural tendency is to slack up or stop the motion of the treadle while the tool is engaged, and the tool is, therefore, at one time under the work, at another time above it, at another jumping rankly in, until, finally, the piece goes whirling out of the centers or the chuck, and the operator flushes all over at his awkwardness.

This, of course, is remedied by practice; and as this article is written mainly for the information of beginners and amateurs, we hope that experts and those who know all about hand lathes will excuse allusion to such simple things as holding the tool properly, and kindred matters.

The lathe must be of such a hight as the workman finds convenient, so that he is not obliged to stoop much, and, at the same time, low enough to allow the weight of the body to be thrown on the tool when hard work is to be done. The speed of the lathe ought to be very high on the smallest cone, and there should be three speeds at least for different work. The object is to regulate the velocity of the work in the lathe, and keep the motion of the treadle uniform, as near as may be, at all times. It distresses a workman greatly, when chasing a fine thread on a small diameter, if he has to tread fast to get up the proper speed, as he does when there are only two speeds. On the contrary, for larger jobs, it is difficult to keep up a rotary motion if the foot moves slowly, as it must in order not to burn the tool by a high velocity on some kinds of work. Foot lathes in general, are not geared, although some are, and ought to have wider ranges of speed than they do. Where one class of work is done, however, it makes little difference, but for general turning the speeds should vary.

Another difficulty experienced by beginners is in holding the tool still—*rigidly so*. They allow it to "hob" back and forth against the work, if it runs untrue, so that it is impossible to make a job. The tool must be held hard down, as if it grew to the rest, and never moved, nor receded, until the cut begun is finished.

The "rest" should be of soft wrought iron, since that material holds a tool with more tenacity; imposing less strain on the arms of the operator. It should be dressed off smooth as often as it gets badly worn, or cut by indentations. Cast iron is not good and steel is not so good as wrought iron. A special rest should be kept for chasing threads with, since the least obstacle is enough, when running up a fine thread, to divert the chaser and spoil the job, by making a drunken thread. If we now suppose the lathe to be in good order, the centers true and well turned to a gage, the rod (if that is the job) between them, and properly "dogged," the centers oiled, and the rest at the right hight, we shall be all ready to start. The rest should be high enough to bring the point of the tool a little above the center.

To rough off the outside, and make it run true, is the first step, and the tool must, therefore, be held as

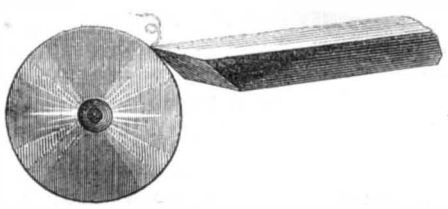

FIG. 2.

in Fig. 2, or so that the point and part of the edge alone engages with the work. This will take off a thin spiral cut without springing the shaft or making it untrue. The whole surface of the shaft must be thus run over, beginning at the right hand and shifting the tool as fast as one part is turned. The tool should not be moved rigidly in a straight line toward the belt, but by holding it hard down on the rest, so that the bottom edge bears as in Fig. 1, (see last article) and rocking the tool on that angle, so that the point describes a curve, as

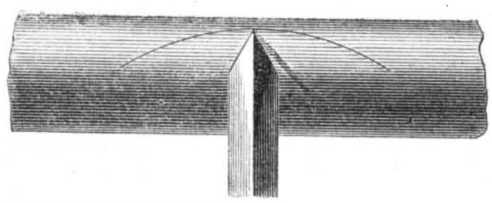

Fig. 3.

in this view. The work will be turned evenly and true.

We must remark in passing, that the person who reads these directions and then undertakes to turn by them, will find that reading how to do a thing and doing it, are two different matters.

It looks very nice to see a skater darting over the ice at his ease, but, try it once, and, if you never knew before, you will understand what experience means. Trying to teach a person to be a turner in a newspaper is analogous. One can only indicate the general method, and leave experience to do the rest.

After the whole surface has been run over, the same tool may be used on the flat side for reducing the work to one diameter throughout the length. The reader must not assume that there is no other tool than a diamond point; he will find many others adverted to, as we proceed.

It is most important that the ends of a rod or shaft should be squared up first before the body is turned, for the removal of some slight inequality subsequently may cause the whole shaft to run out of truth. The center must be drilled with a small drill and slightly countersunk. When the end is squared up, the center must be run back a little so that the tool point may project over the drilled hole, and thus make it all true about the center, as in Fig. 4.

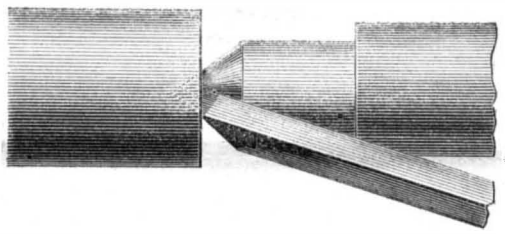

Fig. 4.

This will make the work push over to one side of the center, but that is of no consequence. Let it run as it will; so long as it does not come out of the centers there need be no apprehension.

Here is another kind of roughing tool to do heavier work with.

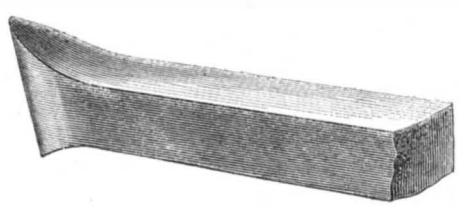

Fig. 5.

There are two kinds of tools used in foot lathes, called straight and heel tools. This is a heel tool.

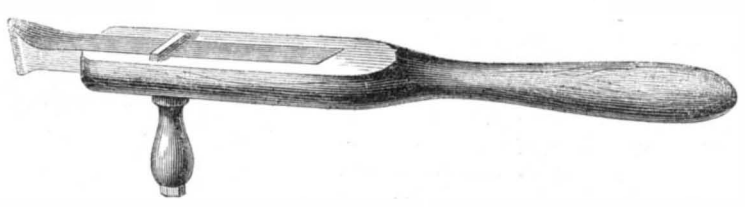

Fig. 6.

It is so called from the heel which is, forged on the lower end. One form of the straight tool has already been shown. The heel tool is used on heavy work, and the object of it is apparent, namely, to hold on the rest and so impose but little labor on the workman to retain it in place, or prevent it from receding. It is generally forged from half inch or five-eighth steel. The steel is held in a handle twenty inches long, grooved on top to fit the steel, and furnished with a handle at right angles. This handle has a square eye in the top that the tool passes through. A nut at the end of it screws up the eye and binds the tool fast in the groove so that it cannot slip.

Here it is complete in Fig. 6. The lower handle enables the workman to have great power over the edge and to direct it from or to the work without danger of catching. The tool is used by resting the

Fig. 7.

end on the shoulder, as in this engraving, and turning the lowest handle. Since the heel holds the tool from slipping there is no occasion to bear against it. In fact, there is no occasion at any time to force the tool from the workman, but it must be turned sideways, back and forth. A piece properly centered may be cut in any way without destroying its truth.

[To be Continued.]

A Protest Against Pharaoh's Serpents.

On the 13th of November, a meeting of the Pharmaceutical Society, of Great Britain, was held at Edinburgh, and, in the course of the proceedings, the following communication was read from Dr. Stevenson Macadam on the poisonous ingredients in the new toy called Pharaoh's serpents:—"The chemical toy which is now sold largely in many shops in this city, at prices ranging from three pence to one shilling each, is composed of a highly dangerous and poisonous substance called the sulpho-cyanide of mercury. The material is a double-headed poisoned arrow, for it contains two poisonous ingredients, viz., mercury and sulpho-cyanic acid, either of which will kill. Experiments have been made by me upon the lower animals, and I have found that one-half of a sixpenny Pharaoh's serpent is sufficient to poison a large-sized rabbit in an hour and three-quarters. A less dose also destroys life, but takes longer to do so. The toy, therefore, is much too deadly to be regarded as merely amusing; and, seeing that it can be purchased by every school-boy, and be brought home to the nursery, it is rather alarming to think that there is enough of poison in one of the serpents to destroy the life of several children; and the more so that the so-called Pharaoh's serpent is covered with bright tinfoil, and much resembles, in outward appearance, a piece of chocolate or a comfit. I hope that the rage for the Pharaoh's serpents will die out in Edinburgh without any disastrous consequences, though such have occurred in other places; but it is certainly an anomaly in the law of the kingdom that a grain of arsenic cannot be purchased except under proper restrictions, and that such articles as Pharaoh's serpents, containing as deadly a poison, may be sold in any quantity, and be purchased by any school-boy or child."

ALUMINUM FOR PENS.—A correspondent sends us the following query:—If aluminum is, when tempered, nearly as hard as steel, is proof against most acids, and but slightly oxidizable, will not some American or English manufacturer put aluminum pens in market, particularly right line or ruling pens? They will find ready sale at remunerative prices.

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SEPARATING GOLD BY LEAD.

The Chicago *Times*, of December 5th, has an account of the trial of a new machine for extracting gold from quartz rock by means of melted lead. The trial was made before a committee of seven gentlemen of Chicago, whose report is published; we give those portions of the report which relate to the machine and its objects:—

"Since by far the greater portion of the gold unmined is found in quartz rock, the means employed to separate it are of prime importance. The subject has engaged the attention of inventors and scientific men for several years past, and the result has been the introduction of hundreds of processes for the crushing of gold-bearing quartz, and the separation of the metal therefrom.

"The difficulties to be overcome are neither few nor slight. In the first place, the gold is inclosed in a very hard rock. Again, it exists generally in very minute particles, often not visible to the naked eye, each one of which is completely enveloped with the quartz rock. In the first place, it is necessary to unlock these flinty vaults in which nature has hidden her treasures, and then to rifle them.

"To accomplish the first is the object of the crushing process. By this the lumps of gold-bearing quartz are reduced to powder, and, of course, a great portion of the particles of gold exposed. To effect this, hundreds of crushing and stamping mills have been invented, the object being to reduce the quartz to powder as finely as possible and as rapidly as possible. Perhaps, however, the old stamping mill, which acts on the principle of the mortar and pestle, is still more efficient than any of the later inventions, and there still exists an open field for the genius of the inventor.

"But the crushing of the quartz is but one-half of the work. We have burst open the safe, but whom can we find with sight so keen and touch so delicate as to be able to pick up these grains of treasure, many of which we can only perceive under the magnifying glass. Here we call in the aid of the chemist, who points out servants who not only have all the love for this shining dust, which is common to so many organized and immortal beings, but, unlike them, the power to sieze upon and appropriate it whenever they come in contact. The most available agents which possess this property are quicksilver and lead. When these metals in a fluid state come in contact with gold, they absorb it and form a composite metal, which is termed an amalgam. This amalgam can then be again decomposed, and the gold separated from the quicksilver or lead.

"The fluidity of quicksilver at ordinary temperatures has made it readily available, and for a long time it was the only agent used in the process of amalgamating, in operations of any extent, and it is still almost exclusively employed. Hundreds of processes for amalgamating with mercury have been invented within the past few years, many of which are as effective, perhaps, as any machine using the quicksilver process can be.

But in many respects, quicksilver is inferior to lead, as an amalgamating agent. In the first place, it is a very costly metal, while lead is one of the cheapest. The use of it, again, is unwholesome and even dangerous, for, in separating it from the gold, after the amalgamation is completed, it must be evaporated, and those engaged in the process are often compelled to inhale this mercurial vapor, the effect of which is always injurious, and not unfrequently fatal. Further, the quicksilver acts very imperfectly as an amalgamator. Only the particles of the gold, which is bright and not enveloped with oxydized metal, sulphuret of iron or vapor, will it deign to touch. Now, the fact is that a very large proportion of the gold contained in quartz is enveloped, not only by the rock, but also by iron pyrites, which mercury avoids, and the result is, that of the whole amount of gold contained in the quartz, and which has hitherto been obtained only by a costly chemical process, not more than 20 per cent is ordinarily extracted; that is, of the whole amount of gold actually mined and crushed, only one-fifth has been extracted and put in circulation! As the gold obtained from quartz forms by far the largest portion of the whole amount yearly mined, some idea may be formed of the great gain to miners, and to the nation, which would be the result of a process which would perfectly accomplish its object and remove all the gold from the ore.

"Within two years past some attention has been paid by inventors to the properties of lead as an amalgamator. It was known that melted lead would form a complete alloy with gold, and, moreover, that it would dissolve those foreign substances which so often prevent quicksilver from incorporating the gold. But lead is not at atmospheric temperatures a fluid metal, and can only be made so by over 600 degrees of heat, and when so melted rapidly combines and extracts from the gold the crude material, with which it may come in contact.

"Chicago has taken the lead in the invention of lead amalgamators. About two years ago Matthew Laflin, of this city, invented the first machine of this kind. Since that time, a machine has been invented and patented by John B. Atwater, of this city, for the same purpose. Several other machines of this kind have also been patented.

"The machine lately invented and patented by another citizen of Chicago, Willard M. Fuller, Esq., whose practical workings we have witnessed to-day, promises to fulfill the requirements of the quartz miner so far as its mechanical construction is concerned. In this machine the lead comes in contact only with the gold-bearing quartz itself, which is simply formed through it by the creation of a vacuum. It depends on the fact that pulverized quartz is as impervious to air as water, and that it is lighter than the melted lead.

"The machine of Mr. Fuller occupies less room than an ordinary fanning mill. The lead is contained in an iron vessel, and is kept in fluidity by a coal fire underneath. The quartz is then forced through the lead by the pressure of the atmosphere, and passed off into a receiver made for the purpose, leaving all the gold, as it is claimed, in the lead!

"In an air-tight vessel partially filled with melted lead, which is kept in a fluid state by a fire in a furnace underneath the vessel, is inserted a cast-iron cylinder surmounted by a hopper open at the bottom, and extending into the lead to within a short distance of the bottom of the vessel. This cylinder serves as a receiver into which the quartz is placed. The exterior air-tight vessel above the lead is connected with an air-tight pump. When the air is exhausted above the lead, the pressure of the atmosphere on the column of quartz in the cylinder forces it down to the bottom of the cylinder, escaping from which it rises through the melted lead by virtue of its own specific gravity, being less than the lead; whence, when it accumulates to a certain hight, it passes off through a pipe to a "tailings" receiver, every grain of it having gone through a column of fluid lead several inches deep. The lead can be drawn off at any time, and the gold separated from it by the usual process."

Only combinations of mercury with metals are called amalgams; a combination of gold and lead is an alloy.

REPORT OF THE CHIEF OF THE BUREAU OF ORDNANCE OF THE NAVY DEPARTMENT.

From the report of Commander H. A. Wise, Chief of the Bureau of Ordnance of the Navy Department, we take the following extracts:—

MATERIAL ON HAND.

In this connection, however, I may remark that the ordnance returns to date show that we have on hand at the several magazines, navy yards, and shore stations, in the aggregate, 4,025,178 lbs. of powder, 491,026 shells, 233,818 shot, 84,300 shrapnel, 47,802 canister, and 21,355 grape, made up, of course, of the different calibers, both smooth-bore and rifle, and of every description used during the war. How much of this immense stock is serviceable and worth preserving, the survey can alone determine.

STORAGE OF GUNPOWDER.

With reference to the powder and its storage, the Bureau has always been opposed to the present system of magazines throughout the country, and has not failed in its annual reports to bring the matter before Congress, and to urge that appropriations should be made for the erection of more suitable buildings in isolated localities in the interior, away from our cities, but near some water course or railway, in order that supplies could readily be brought to smaller magazines on the seaboard.

The whole subject has been carefully considered, and, as stated in its last two annual reports, "whenever the necessary appropriations shall have been made, the Bureau will be ready with the information and data now in its possession, to proceed immediately with the erection of suitable buildings." This expenditure can be made from the appropriation of the present fiscal year, if Congress will but authorize it, and this question, of such vital importance to the navy and the country, be settled at once.

CAST-IRON GUNS.

During the recent rebellion the cast-iron smooth-bore guns of the navy endured all of the severe service to which they were subjected, and proved their excellence every where and under all condition of actual war. Not a single gun of the Dahlgren system has burst prematurely, and none of the XV-inch guns, even when fired with their heaviest charges, have ever failed, except in the case of two or three which had their muzzles ruptured by the premature explosions of shells—the body of the gun even then remaining uninjured. For the ordinary warfare of wooden ships against each other, or against forts, these smooth-bore guns are undoubtedly the best of their kind; while the practice at the test battery against armor plating shows that even the XI-inch at close quarters is capable of piercing any thickness of iron or steel with which the sides of an ordinary cruiser, intended to keep the seas, could be covered with safety, and this without any danger of rupture from the use of increased charges, unless the gun has been very much weakened by previous service.

ROLLING OF THE "DUNDERBERG."

At this time, also, the ingenuity of ordnance men is exercised in producing a proper iron carriage upon which to mount the guns of the *Dunderberg*, which, unlike the turreted monitors, is expected to roll to such an extent as to make it doubtful whether they can be controlled even by a resort to machinery and steam. In England, the attempt to govern the movement of the 12-tun guns on board the *Minotaur*, in a seaway, proved a failure, and we may therefore be compelled to enter into an elaborate series of experiments before deciding a question of so much importance. I refer more particularly now to the iron carriages for the XV-inch guns, for if they can be controlled in recoil and other movements, there will be no difficulty with the XI-inch guns.

BREECH-LOADING SMALL ARMS.

There can be no doubt that the minds of military men in this country and in Europe are fully convinced of the necessity and advantages of substituting breech-loading musket or carbine for the muzzle-loader, and the consequent use of metallic cartridges. During the past year a series of elaobrate experiments have been made by the army ordnance, at Springfield, with various models of breech-loaders, but as yet no definite conclusion has been reached regarding the most appropriate one for general use in the field; and this has prevented the Bureau from carrying out its cherished idea of establishing a breech-loading system for the navy, to include also a pistol of the same caliber as the carbine, so as to have one cartridge for each arm. As soon, however, as the Bureau is advised of the action of the army authorities, it will be prepared to enter at once upon such trials as will determine whether the one selected is suitable for naval purposes, and if so, to place it on board our ships, and get rid of the several varieties of muskets, rifles, and carbines, which are now in use. The best results are especially anticipated from the adoption of a single-barrel breech-loading pistol in the hands of seamen, in lieu of the revolver, which should only be used by officers as a belt weapon.

A number of arguments in favor of the changes here alluded to were given in my last annual report, and it is needless to repeat them here. The outlay necessary to carry out the plan, will be but trifling, as the whole number of arms required for the peace establishment will not exceed 10,000, and the cost of these will be partly met by the proceeds of the sale of the arms set aside.

CORNISH PUMPING ENGINES.—The number of pumping engines reported for Sept. is 31. They have consumed 1,904 tuns of coal, and lifted 13·7 million tuns of water 10 frames high. The average duty of the whole is, therefore, 48,600,000 lbs. lifted 1 foot high, by the consumption of 112 lbs. of coal.

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Correspondence

Gravity Railroad.

MESSRS. EDITORS:—Could not the principle in mechanics, that a round body will roll down an inclined plane, be made available for the transportation of letters and other small parcels from place to place? Let us suppose that two adjacent cities are nearly upon the same level; let two inclined planes be constructed between these cities; these inclined planes to consist of iron tracks—say three feet wide—made of small, smooth iron rails; let hollow balls of suitable size be constructed to run along these rails; fill these balls with whatever you please and give them a great initial velocity, hurling them down a steep descent, and then "let 'er rip." A plane with a descent of a foot or mile would be sufficient, I should think, to maintain, if not increase, the velocity with which the balls would start. This, however, is a question which can only be decided practically by experiment, although any mathematician can easily solve the problem involved in the experiment, namely, "With what power would a given ball descend a given inclined plane?' If these cities are too far apart to be connected by single inclined planes, a series of these planes might be constructed. If the cities are not on the same level, it would, of course, be easy to construct an inclined plane from the upper to the lower city. From the lower to the upper city a greater or less number of planes would have to be constructed, according to the difference of the altitudes of the two cities. There would be no actual necessity for the tracks being perfect inclined planes. On the contrary, provided no portion of the track is higher than the standing point, and there is a real descent from the beginning to the end, the track might curve up and down considerably, to suit the exigencies of the country over which it passes. The whole question in a nut shell is simply this:—whether, instead of using power to carry matters from point to point along a horizontal line, it might not be practicable and better to use power and raise that same matter upward, and let it run from point to point along our inclined planes.

W. H. B.

Baltimore, Md., Dec. 8, 1865.

[We believe the great coal company, known as the Delaware and Hudson Canal Company, has a railroad, extending from the head of their canal to their coal mine in Pennsylvania, that is constructed and operated on this principle; but the plan is not a favorite one with civil engineers. Some of the directors of the Western Railroad proposed this method for surmounting the Leicester Summit, and the writer of this ran a line of levels over the summit and drew a profile of the plan, but the scheme was so decidedly opposed by the engineers that the directors were induced to allow it.—EDS.

Foundations.

MESSRS. EDITORS:—In a report made by Professor Bache, of the Smithsonian Institute, recommending League Island, a vast marsh in the Delaware River, as a suitable place for the proposed iron-clad navy yard, he states that a soft soil is the best suited for heavy machinery, as the yielding properties would be less jarring on the ponderous weights that must rest upon it.

A firm in my neighborhood has been at vast expense digging through clay soil, to reach harder material upon which to place stones of the heaviest character, as a foundation for heavy machinery to be used in the manufacture of heavy iron bars and plates, and they still insist that the foundation could not be too permanent, and that the least yielding in any particular would destroy the machinery. Which theory is to be relied upon?—that of the learned Professor or of the men of practical experience?

A NOVICE.

Reading, Pa., Dec. 8, 1865.

[Experience in forging iron, and in running machinery of any kind, we believe generally leads men to the conclusion that their foundations cannot be too solid.—EDS.

Electro-plating Steel Springs.

MESSRS. EDITORS:—An article copied from the Philadelphia *Inquirer*, on page 336 of the SCIENTIFIC AMERICAN, suggests that a galvanic action is set up in boilers under certain circumstances there named, which tends to weaken the iron. The suggestion is only theory—indeed hardly that—and, of course entitled to consideration only as like suggestions are. There is a fact, however, that may render this theory worthy of notice among those whose business or pleasure it is to investigate. It is this, a steel spring cannot be electro-plated or gilded without being rendered more or less brittle. If a strain is put upon it while in the process, equaling that of ordinary use, it will frequently break before the operation is completed, and that without being touched, and, if completed with no strain upon it, it is not reliable, and will generally snap, sooner or later, unexpectedly. This fact I have frequently observed, and have not been able to trace it as the effect of preliminary processes of cleansing, etc.

Since writing the above, I am told by an intelligent and experienced electro-plater, that this statement accords with his experience. JOHN SMITH.

Baltimore, Dec. 2, 1865.

[No fact in physical science is more fully established than the formation of an electric current when two metals are brought in contact and subjected to chemical action.—EDS.

Recent Foreign Intelligence.

We find the following letters in the *Mechanics' Magazine*:—

SOFTENING CLAY.

Your last week's number contains a note on the softening of clay for modelers, by means of glycerin—will you allow me to point out to each of your readers to whom it may be of use a cheaper method of effecting the same object? Some year or two ago I had an apparatus at work in my laboratory, parts of which required at intervals to be removed, replaced, and reluted. The mixing of fresh pipe-clay and water every day or each time it was necessary became a bore, so I mixed a quantity once for all, using a solution of chloride of calcium of about 1·350 specific gravity instead of water. I found that I had fully achieved my object, inasmuch as my luting kept good during the whole course of the experiments, and, further, the other day I picked up in a bye corner of the laboratory a piece of this very same luting, as soft, as plastic, and evidently as fit for use as ever. I may add that at the time it struck me that I had read that it was necessary for modelers to keep their clay in a soft state, but I also thought it was necessary that it should be capable of being dried—which when mixed with cloride of calcium it would be impossible to do.

PETER HART.

COMPRESSED MOIST HOT-AIR ENGINE FOR MARINE PURPOSES.

On Saturday last, in accordance with the advertisement which appeared in the previous number of the *Mechanics' Magazine*, the trial of a boat propelled by my portable moist-air engine, came off on the Thames, at Lambeth, and I beg to forward you the following particulars:—The boat into which the engine was placed, without any fitting, is 22 feet 6 inches long, by about 5 feet 6 inches beam, and 2 feet deep, and is capable of seating from fifteen to twenty persons. The engine has one cylinder 4 inches diameter and 12-inch stroke, driving a pair of light paddle wheels, 3 feet diameter, about 80 revolutions a minute. The power of the engine is about 1 horse, and the weight of the boiler and engine is about 300 lbs. The maximum speed attained through the water was six miles an hour, but the average speed was five miles an hour. The consumption of fuel in three hours' work was a peck of gas coke which cost (retail) 1½d., coals (4 lbs.) 1d.; total cost for three hours, 2½d. As the boat is capable of carrying 1½ tuns of coal, it would be equal to a voyage of between 3,000 and 4,000 miles, without further fuel. The reason of the extraordinary economy of fuel arises from the use of the latent heat of the steam as a motive power, but which is wasted in all other steam engines. The engine, when not required for the boat, is easily lifted out and may be used either as a light road engine or as a fixed engine of one-horse power, working for less than 1 d. an hour for fuel. Half the fuel and two-thirds the space might be saved in all steam vessels with the same speed or a much higher speed obtained than has been hitherto accomplished.

J. PARKER.

Annual Meeting of Iron and Steel Manufacturers.

The Philadelphia *Press* of December 14th says:—

"The members of the American Iron and Steel Manufacturers' Association of the United States assembled at the Board of Trade room, yesterday morning, for the purpose of holding their second annual meeting. Representatives were present from most of the iron and steel works throughout the Union. In the absance of the President, E. B. Ward, Esq., of Detroit, Michigan, Samuel J. Reeves, Esq., of this city, occupied the chair.

"It is shown by the report of the Secretary *pro tem.* that the product of the blast furnaces in 1864 was 1,149,913 net tuns. Of this, 684,319 tuns were anthracite pigs, 210,108 of raw coal make, and the balance of charcoal make. The products of Pennsylvania and Ohio exceeded one million tuns.

"In 1856, the whole number of charcoal furnaces in the United states was 156. The product of new iron for 1864 was 974,876 tuns.

"The amount of pig iron, scrap-iron, etc., worked up in 1864 was about 1,400,000 tuns. It is evident that this important interest is to be largely developed here in the next few years, and it is the duty of the Government to extend to it every encouragement.

"In 1849 there were 79 charcoal furnaces in Pennsylvania east of the mountains, which produced in that year 55,617 tuns. By the year 1860, 32 of these had finally ceased operations. To the remaining 47, at least 7 new furnaces had been added; the production in that year was 36,576 tuns. In 1864, 42,953 tuns were made. West of the Alleghany Mountains, in Pennsylvania, there has been since 1849 a very marked and rapid decrease in the production of charcoal iron. This region in 1849 produced 55,494 tuns of charcoal iron, 85 furnaces being in operation. In 1884, 9 furnaces only were in blast, producing 8,701 tuns. This remarkable decrease in the quantity of charcoal iron made in Pennsylvania can be ascribed to the operation of several agencies:—

"1. One that has been active for a number of years viz., the absorption of wood for agricultural purposes.

"2. One of recent introduction, viz., the great demand and consequent high price of labor, resulting from the discovery of vast quantities of petroleum in the valleys of the Alleghany and its tributaries.

"3. The extensive introduction of the manufacture of iron from coke and raw coal. These causes, operating with more or less intensity throughout the Eastern States, will probably gradually drive the charcoal iron manufacture into the Western and North-Western States, where wood is cheap and where the ores are of unexampled purity and richness. The total production of charcoal pig iron in the country in 1864 amounts to 255,486 tuns.

"The product of the rolling mills making railroad rails in the United States for 1864 was as follows:—

	Roll Mills.	Total Produced.	Present Capacity.
Massachusetts	2	30,312	37,000
New York	5	57,433	98,000
New Jersey	1	11,687	12,000
Pennsylvania	14	159,610	348,000
Maryland	2	5,488	29,000
West Virginia	2	844	18,000
Ohio	3	20,301	66,000
Kentucky	2	4,441	25,000
Indiana	1	12,773	30,000
Illinois	3	26,880	80,000
Michigan	1	5,600	20,000
Missouri	1	.....	10,000
Tennessee	1	.....	9,000
Georgia	1	.....	9,000
		335,369	792,000

THE superiority of iron over wooden sleepers is manifest on the Madras Railway; all the sleepers on the North West line are iron, and consequently the cost of maintenance is found to be less than on the South-West line, where the sleepers are of wood. The Company propose to renew half the South-West line with iron sleepers; the other half passes through a district where teak and other timber fit for sleepers are obtainable, so that iron need not there be used.—*Mechanics' Magazine.*

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ENGINEERING ENERGY IN AMERICA.

A few months since, the prophets of evil in this country expected an extraordinary and sudden collapse of the great American Republic. The hubble was about to burst, and the mighty sham which boasted so much was about to go into a state of "everlasting smash." No doubt the wish was father to the thought in most instances, and the prophets, as Ben Disraeli says, are "baffled and mortified." It is not our province, however, to point out the errors of our countrymen, or to speculate on the political destinies of the American Republic, but rather to utter a passing comment on the amazing industrial energies of Americans, as indicated by Sir S. M. Peto, at Bristol, on the 13th inst. That prince of contractors went with others to America to endeavor to find fresh outlets for English capital. The newspapers have already informed us that wherever they went they were warmly and enthusiastically received. Sir Samuel, who is accustomed to see great engineering works achieved with rapidity, appears to be startled by the strong, buoyant, and multitudinous energies of our American cousins. He ascertained that when the Southerners destroyed the bridges throughout 150 miles of country, Gen. Sherman only allowed Gen. McCallum seven days to reconstruct them; one bridge 1,200 feet long and 15 feet wide was constructed in three days and a half; that in six days General Sherman was moving the whole of his army over the 150 miles. Sir Samuel also states that on the termination of the war there were actually connected with the supply of the armies 2,500 miles of railway, 387 engines, 600 cars, and 70,000 employees. Well might the imagination of the speaker be almost overwhelmed with the power which produced such a state of things. Sir Samuel further states that Chicago, which a few years ago was a mere village—a dot upon the map—has now a population exceeding a quarter of a million, "with public buildings surpassing anything he has ever seen in any provincial town in this country; while its bridges, its roads, its hospitals, its universities and public works were of the most magnificent description." From Chicago Sir Samuel went to Boston, and he found that even since the commencement of the war, the inhabitants of the city had expended five millions sterling in the erection of public buildings and the extension of public works. Were not the speaker a sober, common-sense Englishman, we should have thought he wanted to play upon our credulity. He, however, is particular in fortifying his statements by substantial evidence. As an instance how soldiers are absorbed into private life, he says that four months before he visited America the army amounted to 1,200,000 men. Gen. Grant told him that he had mustered out 870,000, and that shortly they intended to have only 30,000 men in active service. When at Chicago he went over a large printing establishment, in which forty-seven of the compositors had been soldiers. One was a captain, another was a lieutenant, and another was a sergeant, and they were all at work as if they had never left the compositor's desk. Not one of these men had a pension, and he would have felt insulted if he had been offered it. These statements of Sir Samuel Morton Peto are corroborated by indisputable authority. We may therefore, as a nation, well rejoice that the Americans have conquered their greatest difficulties, and that in all probability they will be purified and strengthened by the sufferings they have endured. At all events, even thoughtless and selfish Englishmen are not likely to speak of them so contemptuously as was the fashion a short time since.—*Building News.*

TO WHOM IT MAY CONCERN.

As the best way of bringing the annexed letters to the notice of the parties interested, we insert them in our paper. The SCIENTIFIC AMERICAN has an increasing circulation abroad, and we are constantly receiving inquiries about American patents, the propriety of investing in them, and general information concerning them:—

HAWKINS'S DIVING MASK.

MESSRS. EDITORS:—I would feel greatly obliged if you could put me in the way of communicating with the manufacturer of Hawkins's Diving Mask or apparatus, as I see it was patented through your Agency.

CAPT. A. CROWN, Russian Navy.

G. Winchester Buildings, Old Broad street, London, E. C.

WELL BORING.

MESSRS. EDITORS:—In your number of SCIENTIFIC AMERICAN, July 1, 1861, I read a short description of automatic well bores by Gen. H. Haupt. Can you give me his address, or tell me if there has been any further or fuller description of the machine?

JOHN ALLEYNE BOSWORTH.

Humberstone Leicester, Eng., Nov. 14, 1865.

Silver, Copper and Railways in Chili.

On a chilly night, thirty years ago, a shepherd made a fire in the mountains of Copiapo, Chili, and next morning he saw at his feet a stream of silver, which the heat had melted. That was the discovery of the mines of Copiapo, which have produced in thirty years more than $100,000,000. Now they are rather in the decay; but the produce of the last year was $1,638,272—a sum inferior to that of Guanajuato and Real del Monte, which Maximilian wishes to develope, in Mexico, against the decided opinion of the old and glorious President, Monroe.

Next follows the province of Loquimbo, whose capital, the beautiful town of La Serena, rests a real syren at the foot of the hills by the sea-side, supporting a population of thirty thousand inhabitants.

The wealth of that province is almost indescribable. There is, indeed, a mountain, that of Famaya, formed, if it could so be said, of pure copper ore. The value of this single product, as it is manufactured in Chili, was, in 1864, of $9,506,957, and that of the copper regulus, or in its more imperfect state, $4,716,912, making in the whole (and not taking in consideration the raw ore sent to England, and which is worth several millions,) the immense amount of $14,221,849.

The London *Times*, denouncing to all civilized nations, in warm and eloquent language, the unwarrantable conduct of Spain toward Chili, declares, in its leading article of the 19th inst., that out of 498,780 cwt. of manufactured copper imported last year into England, 304,380 cwt., that is to say, more than two-thirds, came from Chili, and that out of 25,000 tons of regulus 22,000 tons, or almost the whole quantity, came from that source.

In the progress of steam locomotion, Chili stands so high that only four countries—the United States, England, France, and Germany—possess greater extent of railroad, taking in consideration the size of the respective countries. Chili possesses at present six main lines of railways.

The northern one connects the port of Caledra with the silver regions of Copiapo, and was the first ever built in South America (1850) previous to the erection of the line of Panama, which has an extent of forty-seven miles. The second is that of Canisal, twenty-four miles in length. It has been built by Americans and native capitalists for bringing to the sea-shore the rich copper ores of the interior.

The third is much more important, as it runs south from La Serena, capital of Coquimbo, and is intended to join with that between Valparaiso and Santiago, a distance of about five hundred miles south. Of this line ninety miles are complete, and as many in course of progress.

The fourth is the famous railway between Valparaiso and Santiago, over immense mountains, built at an expense of twelve millions of dollars. It was laid out by the eminent American civil engineer, Allen Campbell, now residing in this city, in a very high position, and completed, as a contractor, by another American of great enterprise and generous heart, Henry Meiggs. This line extends over more than 135 miles over a rough country, and is considered a work inferior to none for its boldness and solidity.

The fifth line extends from Santiago, through the inland valleys and over level ground, to San Fernando, a distance equal to that between Valparaiso and Santiago, but, passing through a highly cultivated plain, it has cost only half the amount of the last. A distinguished American engineer, Colonel Walter W. Evans, now of this city, was the builder of this railway.

Lately, grants for four new branches of railroads were made by the Legislature, and the line going southward from Santiago will be extended this summer to Curico, at an expense of nearly $1,500,000.

The purpose of the government is to build a central line between Santiago and Concepcion, on the banks of the Biobio, a distance of about 600 miles, of which there are 150 completed, the whole of the country having been carefully surveyed. The actual value of the railways of the country, which measure nearly 500 miles, is $30,000,000, and it is thought that at the expense of less than that amount more, a complete line of rails will run from La Serena to Concepcion, (a distance of more than 1,000 miles,) and all within the course of ten or fifteen years.

When this great work, to which the country and Congress lent their utmost support, will be completed, Chili cannot but be the best organized and best protected against internal or foreign foes among all other countries. Lines of telegraph run parallel to all the railways, and the very day war was declared against Spain orders were given to extend the magnetic wire from the northern to the southern extremity of the country, which work has been undertaken with unabated energy.

Steel Ropes.

In a paper by John Fowler and David Greig, of Leeds, Eng., read before the Institution of Mechanical Engineers, the following statements were made in reference to iron and steel ropes:—

The fourth difficulty to be surmounted was, the production of a rope of sufficient strength and hardness, combined with elasticity, to stand the required work; and this was a very serious point, as the inability to accomplish it nearly upset, at one time, the profitable employment of steam cultivation.

The first rope used was made of iron wire; but it was worn out so quickly, not doing so much as 200 acres, that it soon became evident such material would not stand the strain and friction attending the work; while, by increasing the strength of the rope, its weight was so much increased as to consume nearly the whole engine power in overcoming its friction. These difficulties became so serious, that great exertions were made to get a rope of steel sufficiently hard to stand the wear of trailing on the ground, and also the friction caused by coming in contact with the numerous pulleys of the machinery then employed; and, in 1857, two steel ropes were applied, which answered the purpose admirably, and performed, with the then imperfect machinery, upwards of three times the amount of work that was done by the first iron rope. From this point, it was established undoubtedly that all risk of the difficulty with the rope causing a check to the application of steam to cultivation was now safely overcome; the introduction of the steel rope having effectually accomplished the object in view. The machinery for working the rope, however, required great improvement and alteration before getting to the point of thorough efficiency with a minimum of wear; the chief objects in these improvements being to have as few bends as possible, and those bends over large pulleys. A great saving in the wear of rope has also been effected by the improved means of keeping the rope tight, and preventing it from dragging on the ground. From time to time, as the various improvements in the machinery have been effected, the increased quantity of work done by the rope before being worn out has been very marked; so that the cultivation of from 2,000 to 4,000 acres can now be accomplished with one steel rope, the amount varying with the nature of the soil and the width of the implement used.

At the commencement of steam cultivation, the iron rope ran a mileage of not over 750 miles before being worn out, costing 1s. 7d. per mile of running. The first steel rope ran 1,800 miles, costing 1s. per mile; and the present steel ropes are running on an average 9,000 miles, costing only about 2¼d. per mile, running with a tension upon them of about 25 cwts., and this, notwithstanding that the price of rope has been increased from £60 to £84 for the ordinary length of rope of 800 yards. The steel rope at present used in steam cultivation is $\frac{14}{16}$ths inch in diameter, and weighs about 2 lbs. per yard, making a total of about 14 cwts. for the length of 800 yards.

THE Mississippi River, opposite St. Louis, was frozen over on the 15th inst.

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Machine for Cleaning Brass Turnings.

This machine is entirely original in idea and arrangement. It is for cleaning brass turnings.

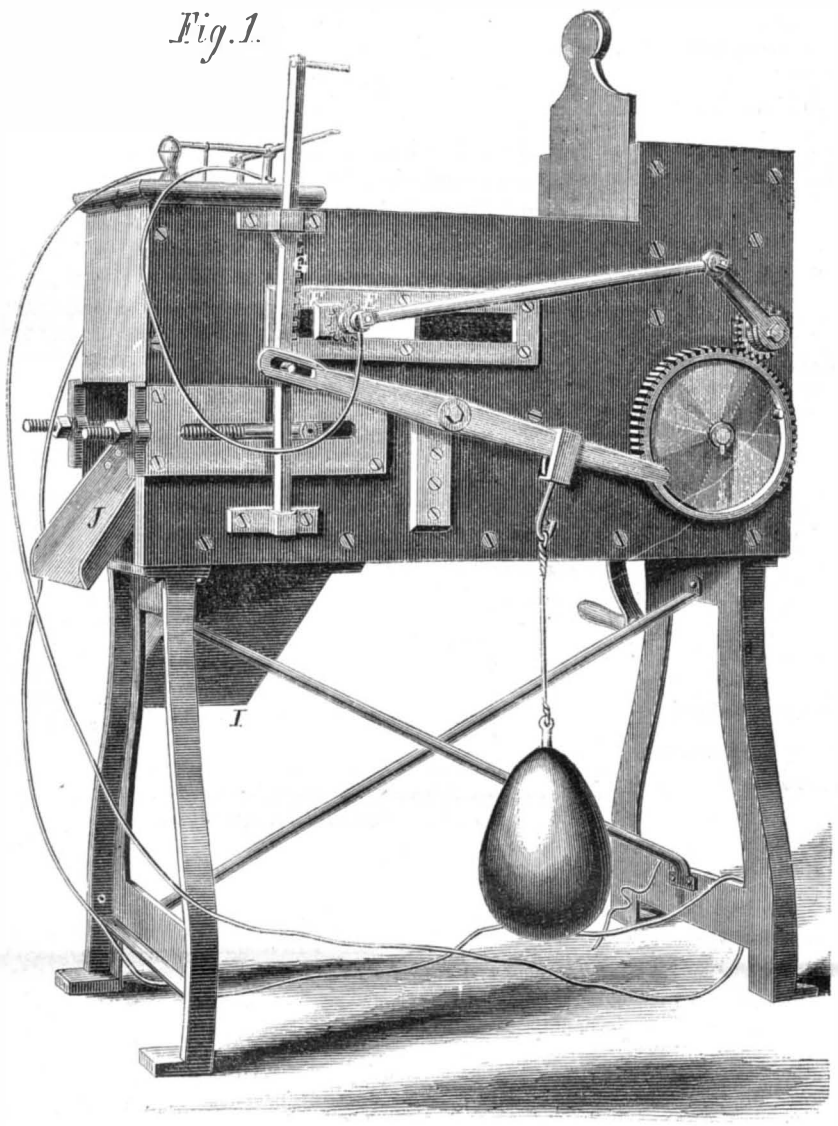
In shops where brass is worked up in connection with other metals, the chips frequently get mixed with iron or steel. Brass is a costly metal and all the chips are remelted to make other castings of. These turnings are usually cleaned by hand. A laborer takes a large horseshoe magnet, spreads the chips out in a sieve or in a coarse cloth and runs the magnet through the mass. All the steel and iron will adhere, and can be easily knocked off into any receptacle.

This machine does the same thing, but much faster and better than it can be done by hand. In detail, it consists of a frame, provided with an endless apron, A (see Fig. 2); a set of horseshoe magnets, B; a battery, C, and mechanism for operating them. The chips to be cleaned are thrown on the apron through the hopper, D. The magnets then travel back and forth through them by means of the gear and pinion, E, and slide, F (see Fig. 1), to which the magnets are fixed.

At a certain point in the circumference of the wheel the slide, F, stops, while the magnets are revolved by the action of the rack, G, on the pinion, E, and thrown over, with the steel and iron chips adhering, against a partition, H; the electric current from the battery above, which has charged the magnets, is then immediately broken, and the chips drop off, as they would from a stick or any other non-magnetic substance. The apron moves on and discharges the clean brass into a basket or box beneath the opening I. The operation is then continued as before, until all the chips are cleaned. The refuse iron is taken out of the end of the machine through a shoot, J. A single-cup Grove battery is sufficient to work the magnets. It will clean from three to five hundred pounds of brass turnings at a nominal cost, and may be worked by hand or by power.

The machine received a silver medal at the last Mechanics' Fair, Baltimore. It was patented on Jan. 25, 1865, through the Scientific American Patent Agency, by Julius Jonson; and is manufactured by J. Jonson & Co., engineers and mechanists, No. 338 W. Pratt street, Baltimore, Md. The whole, or State and county rights, for sale.

Fig. 1.



JONSON'S MACHINE FOR CLEANING BRASS TURNINGS.

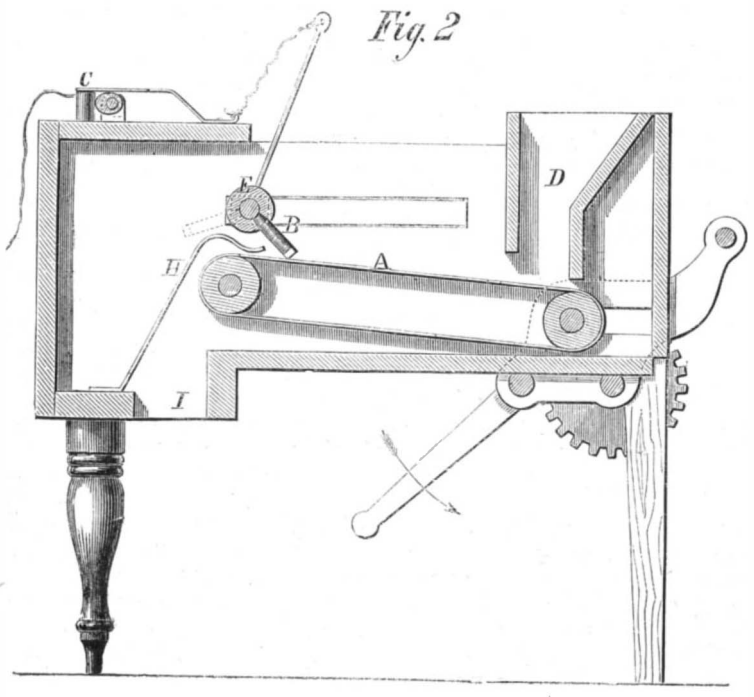
Experiments with Yeast.

Some interesting facts respecting yeast have been brought before the Academy of Sciences by M. Bechamp, in a note "On the Physiological Exhaustion and Vitality of Beer Yeast." The author washed and washed globules of yeast until they appeared to be mere envelopes of cellules, and found that they still retain the power of changing cane sugar into glucose and setting up the alcoholic fermentation, which proves, he considers, that the property of setting up fermentation resides in the properties of the living cellule, and is a consequence of the act of nutrition of this cellule.

The most Fusible Alloy.

Mr. B. Wood, of Albany, N. Y., writes us that the article under this heading, recently copied from the *Mechanics' Magazine*, of London, where it is claimed to be a recent foreign discovery, describes identically, the same metals and processes patented by him in 1860. Mr. Wood sends us an article, accompanied by proofs, of his claims to be the original discoverer, but its length prevents us from publishing it. Correspondents will greatly oblige us by making their communications as much to the point as possible. It not unfrequently happens that matter otherwise available has to be excluded from this cause.

Fig. 2



Utilizing Sawdust--Oxalic Acid.

Sawdust is converted into oxalic acid on an extensive scale in England, by a very simple process.

The sawdust is first saturated with a concentrated solution of soda and potash, in the proportion of two of the former to one of the latter; it is then placed in shallow iron pans, under which flues run for a furnace, whereby the iron pans are made hot, and the saturated sawdust runs into a semi-fluid state. It is stirred about actively with rakes, so as to bring it all in contact with the heated surface of the iron, and to granulate it for succeeding operations. It is next placed in similar pans, only slightly heated, by which it is dried. In this state it is an oxalate of soda mixed with potash. It is then placed in the bed of a filter, and a solution of soda is allowed to percolate through it, which carries with it all the potash, leaving it tolerably pure oxalate of soda. It is then transferred to a tank, in which it is mingled with a thin milk of lime, by which it is decomposed, the lime combining with the acid to form the oxalate of lime—the soda being set free. Lastly the oxalate of lime is put into a leaden tank or cistern, and sulphuric acid is poured in; this takes up the lime, and sets free the oxalic acid, which readily crystallizes on the sides of the leaden cistern, or on pieces of wood placed for that purpose. This is the cheapest process yet known for making oxalic acid. Another interesting use made of sawdust of hard woods, such as rosewood, ebony, etc., is that recently known in France under the name *bois durci*. The various kinds of sawdust used are reduced to fine powder, and mixed with blood into paste; other materials are doubtless added, for, when pressed into molds, it is a jet black, and receives the most beautiful impressions.

Coal-gas Explosions.

If sixteen parts of air be mixed with one of coal gas, the mixture will explode feebly, and with little force; but if the proportions be gradually altered from sixteen parts of air and one of coal gas down to ten parts of air and one of coal gas, the violence or explosive power of the mixture will be seen to increase gradually, until this latter mixture is reached, when the explosive power attains its maximum. If, now, we still go on diminishing the proportion of atmospheric air, we shall perceive that the explosive power of the mixture also diminishes, until we reach a point at which two parts only of air are mixed with one of coal gas, when the power of explosion in the mixture ceases altogether, or becomes *nil*. Briefly, then, seventeen parts of atmospheric air and one of coal gas will neither explode nor burn; ten parts of air and one of gas will explode violently; and two parts of air and one of gas will burn, but will not explode; and within the range of these limits mixtures may be formed having any required degree of explosive force.

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VOL. XIII., NO. 26....[NEW SERIES.]..*Twentieth Year.*

NEW YORK, SATURDAY, DECEMBER 23, 1865.

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END OF THE VOLUME.

THE present number closes the thirteenth volume of the new series. At this time there will also expire a large number of subscriptions, and, in accordance with a long-standing rule, the paper will be discontinued unless the subscription is renewed. We trust that all our old patrons will not only promptly renew their own subscriptions, but induce some of their neighbors to join with them in a club. Remember, we furnish the paper to clubs of ten names or upward at $2 50 each per annum. Send in your clubs and subscriptions.

TO OUR READERS.

It is over twenty years since the SCIENTIFIC AMERICAN first made its appearance. In the beginning, and in other hands, the experiment was somewhat crude; indeed, it was a considerable time before the public could be brought to believe that a journal, devoted especially to the development of the great industrial interests of the country, could succeed. Political, religious, and literary journals, in great numbers, found plenty of readers. Almost any man of good sense, and with some means, could enter these departments of journalism, and hope, at least, for success, but many deemed it presumptuous to attempt to work a successful journal exclusively in the interest of the Mechanic, Inventor, and Manufacturer, unless its columns were opened to sensation stories, and to political and literary gossip. As for ourselves, we had an abiding faith in success, and we determined so to conduct the SCIENTIFIC AMERICAN that it would take its place among the permanently useful journals of the world. When this fact came to be fully recognized several imitators or rivals began to make their appearance, hoping to pluck our laurels, or, at least, to divide them. But now, after the lapse of one-fifth of a century, this journal stands as the only successful one of its kind in this country; and we venture to assert that it has now a larger circulation than that of all similar journals of the kind, in this country and England, combined. We have subscribers in every civilized country on the globe. Our paper goes to the chief departments of the Government, and is regularly filed therein; it is found on the tables of all the principal reading rooms of the country, and is preserved in all the chief libraries of the world. We have just completed a set from the beginning for one of the first libraries in Constantinople. It is safe, therefore, to say that not less than one hundred thousand persons are weekly readers of this journal.

Upon the inventive genius of the country the SCIENTIFIC AMERICAN has exercised a wonderful influence. Such has been the uniform testimony of every experienced officer connected with the Patent Office; it has been felt and acknowledged not only by the principal manufacturing establishments of the country, but by the many thousand inventors who have sought our professional assistance in obtaining patents for their valuable inventions and discoveries.

We begin the new year with an accumulated experience of twenty years, and with a determination to keep the SCIENTIFIC AMERICAN far in advance of all similar publications, relying upon the support of our generous patrons, who have never yet failed to appreciate our efforts and exertions.

THE RIGHTS OF JOINT PATENTEES.

On page 44, Vol. X., SCIENTIFIC AMERICAN, we published at length the opinion of Judge Chapman, of the Supreme Court of Massachusetts, in reference to the rights of joint owners of patents.

The judgment of the Court was substantially that joint owners of patents must be regarded as having interests which are distinct and separate in their nature, though they are derived from the same contract; and having such interests, with the right to use them separately, they cannot for any legal use of them incur any obligation to each other.

We publish, on another page, a judgment delivered by the Lord Chancellor of England, that involves the same question of joint ownership, from which it will be seen that substantially the same opinion is held.

Inventors should take notice of this judgment, as it involves a matter of great importance to their interests. A wealthy manufacturer, possessing a small fractional interest in a patent, can go on and manufacture and sell the patented article or machine without liability to the other owners.

Inventors should not give up their rights without a special contract setting forth the amount to be paid to them by the other joint owners, in the event of their engaging in the manufacture and sale of the patented invention. This contract or agreement ought to be incorporated into the assignment of the right.

BOILER INCRUSTATIONS.

We have received from Charles F. Chandler, Ph. D., Professor of Analytical and Applied Chemistry, in the School of Mines, Columbia College, New York, a copy of a report made by him on boiler incrustations to the President and Directors of the New York Central Railroad. It gives the results of seventeen analyses of the waters used in locomotives on the line of that great road, and of several analyses of incrustations found in the boilers, with an exceedingly able and lucid discussion of the subject, including an examination of the principal remedies. It is by far the best treatise on boiler incrustations that has ever come under our observation, and we shall lay the principal part of it before our readers in our next number.

CRYSTALLIZED gypsum is about to be used for building houses in Nevada, where large quantities are found. It is as translucent as glass, and, of course, people who live in such dwellings will be careful not to throw stones.

PRESERVING TIMBER.

We have on our table two inquiries from widely separated correspondents, in regard to the best mode of preserving timber which is exposed to the action of the weather. Among the numerous substances which have been proposed for preserving wood, the following have been found effectual:—corrosive sublimate, sulphate of copper, sulphate of lime, chloride of zinc, coal tar, and petroleum. None of these answer the purpose if applied as an external coating; the wood must be saturated with them, and this can be done effectually only while the wood is green.

The use of corrosive sublimate—the chloride of mercury—was patented in England in 1832, by Mr. Kyan, and the process is known as kyanizing. The wood is immersed in a solution of chloride of mercury until it is saturated. In the case of large timbers, the wood is placed in air-tight tanks; the air is exhausted, and the solution is forced into the tank under pressure. The results of this method were very satisfactory, but its high cost has caused it to be generally abandoned.

The oily mixtures obtained by a rough distillation of gas-works tar was suggested by Mr. J. Bethel, of England, and it is now extensively used in that country, especially for the preservation of railway sleepers and ties. The air is exhausted and the liquor is forced into the pores under a pressure of 150 lbs. to the inch.

In France, the method suggested by Dr. Boucherie is extensively employed. The substance used is sulphate of copper, and it is forced into the pores by the pressure of its own gravity. The timber is set on end and covered with a water-tight cap, into which a flexible tube leads the liquor from a tank placed at an elevation of thirty or forty feet. The sap is forced out at the lower end by the pressure, and its place is occupied by the preserving liquor. The strength of the solution employed is 100 parts of water to 1 of the blue vitriol.

The method which has met with most favor in this country is that called burnettizing; it was patented in England in 1838 by Sir William Burnett, and consists essentially in saturating the wood with a solution of 1½ parts of chloride of zinc in 100 parts of water. In 1850 the Locks and Canals Company, of Lowell, erected an apparatus by which 7000 feet of lumber could be burnettized at one operation, at an expense of $5 or $6 per 1,000 feet. A cast-iron cylinder, 60 feet long and 5 feet in diameter, with one head movable, was connected with a steam pump, by which the air could be exhausted, and the liquid forced in under a pressure of 125 lbs. to the inch. The wood was piled on a truck and run on a rail track into the cylinder. The operation of exhausting the air and forcing the liquid into the pores occupies seven hours and twenty minutes.

Petroleum, from its great facility for entering capillary tubes, will work its way even into seasoned lumber; more readily, indeed, than into green, as it is not disposed to mix with water. If petroleum is employed, it would doubtless be best to use the heavy lubricating oils from the Ohio wells, as they are less volatile than the lighter oils of Pennsylvania, and would, consequently, remain longer in the timber. Though petroleum has long been used in India for preserving timber, we have no knowledge of any trials with it so thorough and conclusive as those which have been made with chloride of mercury and chloride of zinc.

Two immense steamboats are about to be built and put upon the Sound. The hulls are to be 358 feet long, with proportionate breadth of beam. The engines are of the beam pattern, with cylinders 109 inches in diameter by 12 feet stroke. They are from designs by Erastus W. Smith, Esq., and are building at the Etna Iron Works, this city. The terminus of the line is at Bristol, R. I.

SUPPLEMENT.

Our columns have been so much crowded of late that we have determined to issue, with this number, a supplemental sheet of four extra pages, which will afford ample room for our copious index, and also give our advertising patrons the benefit of our extended circulation.

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ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING DECEMBER 12, 1865.

Reported Officially for the Scientific American.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

51,408.—Butter Worker.—J. P. Adams, Whitney's Point, N. Y.:

I claim the arrangement of the frame A, the spring, d, and the swinging frame, D, substantially as and for the purpose specified.

51,409.—Stove-pipe Damper.—J. C. and A. B. Allerton, Aztalan, Wis.:

We claim the arrangement of the damper, A, with the strips, c, formed at right angles thereto, connecting the offsets, D, with the center, C, in combination with the openings, f f, being a new article of manufacture, as and for the purpose set forth.

51,410.—Lock Key Fastener.—James B. Ayer, Malden, Mass.:

I claim the supplementary escutcheon B, above described, provided with a hinged leaf capable of being raised and locked in a horizontal position, the several parts being made and applied substantaily as above set forth

[This invention has for its object the construction of an escutcheon for locks, which will prevent the lock from being picked from the outside, prevent the key from being turned from the outside by instruments applied to its heel, and will prevent persons from looking through the keyhole. It consists in a supplementary escutcheon, which is pivoted at its top to the ordinary escutcheon, or to the lock plate, and which has a lateral slot to receive the shank of the key, and a hinged leaf that when raised lies flatwise upon the lap of the key to prevent it from being turned, said leaf being moreover locked, when it is raised, by a sliding bolt that passes through the supplementary escutcheon into the ordinary escutcheon or lock plate.]

51,411.—Illuminating Public Clock.—Thos. Ives Bailey, Nashville, Tenn.:

First, I claim the combination of the tubular hands, J K, tubular spindle, A, and flexible tubes, F, arranged to operate substantially as and for the purpose set forth.

Second, The plugs, B and M, and bosses, C, when used in the manner and for the purpose set forth.

Third, The chamber, x, formed in the hour hand-socket, the ears, b, on the bosses, C, and the bracket or fixture, D, for the purpose specified.

51,412.—Automatic Stop Motion for Steam Engines.—H. B. Beckman, Newburyport, Mass.:

I claim the arrangement of the lever, g, springs, b b, toes, a, and tappets, f, in connection with the ball, k, for the purposes herein described and represented.

51,413.—Machine for Separating Fibrous Plants.—Jas. R. Beckwith, New Orleans, La.:

First, I claim the use of self-acting nippers, in combination with suitable stripping jaws, constructed and operating substantially as and for the purpose described.

Second, The combination of the self-acting stripping teeth with the stripping jaws, substantially as and for the purposes set forth.

Third, The reciprocating table in combination with the stripping jaws and nippers, constructed and operating substantially as and for the purpose specified.

Fourth, The self-acting curved clearing arm, in combination with the nippers, constructed and operating substantially as and for the purpose set forth.

Fifth, The application of a self-acting spring dog, in combination with the stripping teeth, constructed and operating substantially as and for the purpose described.

Sixth, The use of a curved elbow lever, g' h', in combination with the stud, r, lever, F, chain, f', and spring dog, e', constructed and operating substantially as and for the purposes specified.

[This invention relates to a machine which is particularly intended to treat the leaves of Agave America, or other similar plants, or parts of plants, in which the fibers are covered with a pulpy substance, but which can also be used for separating fibers from other plants.]

51,414.—Watch Escapement.—Louis Billon, Brooklyn, N. Y. Antedated Aug. 28, 1865:

I claim the combination of the cylinder or rest-piece, C, the wheels, A and B, and table-roller, D, constructed and operating substantially as described for the purpose set forth.

51,415.—Water Meter.—Geo. F. Blake, Boston, Mass.:

First, I claim the arrangement of the water-ways in the manner described.

Second, Giving to the valves of both cylinders the same size, form, construction, and mode of operation, as and for the purpose specified.

Third, The rod J, arranged as described in relation to the cylinders, B C, for the purposes set forth.

Fourth, The arrangement for conjoint operation of the valves, water-ways, ports and plungers, in the manner set forth, for the purpose of preventing the plungers from getting on centres, as specified.

51,416.—Weighing Apparatus.—Orville S. Bliss, Fairfield, Vt.:

I claim in weighing apparatus with two beams, having a single suspension and double connection, as described, extending one or both beams beyond the pivots at one end, and graduating such extension for a movable poise or poises.

51,417.—Gate Fastening.—Webb Broomhall, Circleville, Ohio:

I claim the catch plates attached to the vertical axis, adjusted by the bolt operated by the spring, and engaging in the rebate of the post, substantially as described and represented.

51,418.—Gage Cock.—John Broughton, New York City:

I claim the detachable body or globe, C, in combination with the shank, B, of a gage cock, and with a valve, the stem of which is provided with wings, b, or their equivalents, substantially as and for the purpose set forth.

[This invention consists in making the body or globe of a gage cock detachable from that part containing the seat, and in applying to the stem of the valve a series of wings in such a manner that by removing said detachable globe, the operation of regrinding the valve is considerably facilitated, the wings on the stem serving as guides which keep the valve square in its seat while being ground.]

51,419.—Lubricator.—John Broughton, New York City:

First, I claim the combination of the reservoir, A, having a central discharge passage, C, with the open tubular spindle, D, when said spindle is provided with openings, f and g, and a solid pointed end fitting the passage, c, substantially as and for the purpose above described.

Second I also claim the combination of the locking collar, H, with the reservoir, A, and tubular spindle, D, constructed and operated substantially as and for the purpose above described.

51,420.—Combined Rein and Back-strap Holder.—John Bullene, Chicago, Ill. Antedated Nov. 29, 1865:

I claim the arrangement and combination of the part, E and D, with the loop or part, h, substantially as described and for the purposes set forth.

51,421.—Machinery for Forming Sheet Metal Ware.—Mellen Bray, Boston, Mass.:

First, I claim the arrangement of the dies, plungers, and machinery for operating the same, all substantially as herein described, for cutting blanks from sheets of metal, and shaping the same into various articles of use at one operation.

Second, The method of giving to the holding surfaces a relief motion to prevent the increasing thickness of tin, caused by being drawn in by the forming die, from increasing the pressure of holding surface, and thereby tearing the tin asunder.

Third, In machinery for cutting and shaping metal, I claim operating the cutting dies by means of forming the toggle-joint, when actuated through the intermediary of connecting rods or links, by vibrating cams expansible, substantially as and for the purposes set forth.

Fourth, In machinery for cutting and shaping metals, I claim operating the forming die by means of levers forming the toggle-joint, when the same are actuated through the intermediary of an adjustable connecting rod, by a vibratory crank, the crank-pin of which is adjustable substantially as and for the purposes set forth.

51,422.—Bungs.—O. R. Burnham, New York City:

First, I claim the curved flange, E, with its edge, b, constructed substantially as and for the purpose above set forth.

Second, I also claim the combination in a bung of the three separate and independent joints formed respectively by the screw threads on its body, the shoulder, a, under its flange, E, and the circular edge, b, of the said flange, substantially as and for the purpose above described.

Third, I claim reducing the weight of metal required for a bung by constructing said bung with a cavity, F, substantially as described.

[This invention has for its object the production of a bung for barrels and other vessels, which will not be attended with leakage around its joints, and which may be applied to and removed from the bung hole with facility.]

51,423.—Broom or Brush.—Marcus L. Byrn, M. D., New York City:

First, I claim a broom or brush made of bundles of corn husks secured together at one end by glue or cement and placed within a metal head, and secured by wire or sewing, as set forth, and provided with a metal socket for the handle, as specified.

51,424.—Coal Stove.—Gardner Chilson, Boston, Mass.:

First, I claim the improved stove as made with the conical dome, the boiler chamber or smoke flue and the projecting cap or platform, arranged together and with the firepot, substantially as specified.

Second, I also claim the stove as made with the annular fender combined with the firepot, the dome, and the cap or platform, substantially as set forth.

Third, I also claim the improved conical dome, as made with annular corrugations, arranged as set forth.

51,425.—Trace Fastener.—D. H. Clock and F. D. Ryan, Newville, Ind.:

First, We claim the fixed pronged metallic plate, g, interlocking with the hame-tug, in combination with the sliding clasp, l, having spring tongue, m, arranged together and operating as and for the purpose specified.

51,426.—Hinge.—Jeremiah Close and Ira Buckman, Jr., Brooklyn, N. Y.:

We claim the center plate, B, having a hinge joint on both edges, in combination with the sleeves, d d, the springs, f f, and outside leaves, A A2, substantially as and for the purposes herein specified.

51,427.—Bed Bottom.—Henry A. Cooke, Charlestown, Mass.:

First, I claim the combination as well as the arrangement of the cams or inclines, d f, the supporters, C D, and their annular springs, F, with the bedstead frame and with the bed bottom, constructed of the longitudinal slats and the traverse bars, arranged together as specified.

Second, I also claim the combination of the two cross bars, b b, their supporters, C D, and their springs, F, with the series of longitudinal slats and with the bedstead frame, arranged as specified.

51,428.—Cultivator.—John Copeland, Quasqueton, Iowa:

I claim the two crossed levers, H H, connected by a pin, a, and applied to the plow beams, B B, to operate in the manner substantially as and for the purpose herein set forth.

I further claim the combination of the levers, H H, perforated bar, J, lever, K, and pin, g, arranged to operate in the manner and for the purpose specified.

[This invention relates to a new and improved cultivator, of that class which are capable of being expanded or contracted in order to conform to the width of the spaces between the rows of plants under cultivation. The invention consists in a novel application of levers to the plow beams whereby the latter may be operated—expanded and contracted—with greater facility than hitherto, and while the device or implement is at work, and so that it will be under the complete control of the operator.]

51,429.—Bed Bottom.—M. C. Cronk, Auburn, N. Y.:

I claim the arrangement of the eye, C, the webbing, e, the bars, D, the rods, t, and the short rods, S, the whole constructed and operating as and for the purpose herein set forth.

51,430.—Apparatus for the Manufacture of Paper Pulp.—John W. Dixon, Philadelphia, Pa.:

I claim the combination of the pulp digester, A, the steam or hot water heating coil, F G H I K, and the circulating pump for throwing the digesting liquid continuously from the bottom to the top of the material to be pulped.

Second, The combination of the lower perforated diaphragm, the heating coil and the circulating pump and tubes.

Third, The combination of digester, A, and the circulating pump, 4, and the heating chamber, D, whereby the heated refuse liquid coming from the digester is made to heat the fresh water which is forced in to supply its place.

51,431.—Apparatus for the Manufacture of Paper Pulp.—John W. Dixon, Philadelphia, Pa.:

First, I claim the combination of the paper pulp digester, and the heating chamber in which the refuse liquid escaping from the digester is made to heat the fresh liquid to be forced into the digester.

Second, The combination of the paper pulp digester, the pump for circulating the digesting liquid, and the coil, F, for heating the liquid while circulating, and the chamber for heating the fresh liquid by the escaping refuse liquid, arranged and operating substantially as described.

51,432.—Process for Making Paper Pulp from Corn Stalks.—John W. Dixon, Philadelphia, Pa.:

I claim the process of making pulp from corn stalks, by digesting them in highly heated water under pressure, substantially as described.

51,433.—Process for Making Paper Pulp.—John W. Dixon, Philadelphia, Pa.:

I claim the process of treating wood, straw, and similar vegetable substances by forcing highly heated water under pressure to circulate continuously through the mass to be pulped by means of a pump as a process or preparatory process for making paper pulp, substantially as described.

51,434.—Seal Lock.—H. W. Dopp, Buffalo, N. Y.:

I claim the combination of bow, A, slot holes, B b, and bolt, C, together with soft metallic seal, d, as and for the purpose described.

51,435.—Nail-plate Feeder.—Daniel Drawbaugh, Eberle's Mills, Pa.:

I claim the arrangement and combination of the revolving feeder, N, with its rods, R, wings, S, three flanges, T, dies, V, and oscillating upright, K, as herein described and for the purposes set forth.

51,436.—Cloth, the Weft of which is Made of Hair, Grass, Etc.—James Downie, Paterson, N. J.:

I claim a cloth formed with selvedges, and woven with a hair or grass woof, made by overlapping the ends of the fibers of hair or grass upon each other, along or around and parallel with a central or guiding thread, and wound, bound or wrapped with a winding, binding or wrapping thread, substantially as described and to the effect set forth.

51,437.—Device for Casting Stereotype Plates.—W. F. Draper, Andover, Mass.:

I claim the arrangement of the bed, A, the frame, B, journaled on centers, 1, the platen, D, plates, C C', and screw, F, operating substantially as and for the purpose described.

51,438.—Machine for Weighing Grain.—Elijah F. Dunaway, Cincinnati, Ohio:

First, I claim the combination of the scale boxes, D and E, with the rods, 7 7, working the apron springs, 2 2, and the upright rod, z, connecting with the extension of the scale beam, H, when arranged as herein described and for the purpose set forth.

Second, I also claim the arrangement and combination of the register wheels, R S T, with their pins operating each other, check, W, and springs, X and Y, as herein described and for the purpose set forth.

Third, I also claim the combination of the rod, P, pawl, 2, and arm, N, when arranged as herein described and for the purpose set forth.

51,439.—Shoemaker's Burnisher.—Richard Egan, Brooklyn, N. Y.:

I claim, as a new article of manufacture, the shoemaker's burnisher, consisting of a movable head, A, metallic socket, B, and handle, C, all substantially as herein described.

[This invention consists in making a burnishing tool for polishing the edges of soles and heels of boots and shoes, so that it is removable from its handle, and in so constructing the handle that it will not be easily injured when the burnisher is heated for use.]

51,440.—Many-barreled Fire-arms.—W. H. Elliot, Ilion, N. Y.:

I claim, First, An oscillating firing pin, when pivoted to the hammer and operated by a cam, substantially as shown and described.

Second, So constructing and operating the cam and firing pin that they shall serve the purpose of ratchet and pawl, substantially as and for the purpose herein described.

51,441.—Gas Stove.—Luther Ewing, Brooklyn, N. Y. Antedated Nov. 30, 1865:

I claim the combination of the conical draught tube, B, cylinder, C, perforated or reticulated plates, b b E, and inclined bottom plate, d, of the concentric cylinders, F G H, all the said parts being constructed and arranged to operate as herein specified.

[This invention relates to a new and improved heat-radiating gas stove, and it consists in the employment or use of a series of cylinders, arranged one within the other, so as to form concentric flues or draught passages, in connection with a gas-burning apparatus, whereby it is believed that a large amount of heat will be obtained by a moderate consumption of gas.]

51,442.—Thermo-electric Battery.—Moses G. Farmer, Salem, and H. Julius Smith, Boston, Mass.:

We claim the improved thermo-electric bar, constructed substantially as herein described, viz: by the addition of some supporting material, more tenacious and less liable to be broken than the bar to which it is applied.

We also claim the employment of an insulating coating applied to the supporting rod or wire, for the purpose substantially as and forth.

51,443.—Spring Slat for Bed Bottoms.—James M. French, East Cambridge, Mass.:

I claim making a joint at each end of a bed slat, or attaching arms substantially as described, said joints being capable of receiving within them a piece of rubber or a spring, substantially as and for the purposes specified.

51,444.—Washing Machine.—Martin Gardner, Sr., Carlisle, Pa.:

I claim, First, The short shafts and their guides, connected and combined with the rubbing segment and its ways, so that the segment may be operated from the outside of the box, and be free to rise and fall with the inequality of the clothes being washed, substantially as described.

I also claim the adjusting or regulating of the extent of the descent of the rubbing segment while it remains free to rise above that limit, by means of the hinged bearers, eccentrics, and turning and holding ratchet and dog, substantially as described.

51,445.—Grain-hulling Machine.—Smith Gardner and Amasa B. Howe, New York City:

We claim so arranging and mounting the disks, C, and arms, D, with the rods or supports, F F, springs, E E, and the keys in the rods or supports, that the pressure or resistance of the disks may be regulated and adjusted at pleasure throughout the series of disks, when the machine is in motion, substantially as shown and described

51,446.—Construction of Screw-propeller Blades.—Charles C. Gates, Albany, N. Y.:

I claim the manner of forming the blades by their irregular curves and widths, and unequal thickness of staves, as combined and arranged as specified and for the purpose set forth.

51,447.—Hinge.—Edwin W. Gilmor, North Easton, Mass:

I claim a hinge, constructed substantially as described, as a new manufacture.

51,448.—Sectional Steam Boiler.—Stephen J. Gold, Cornwall, Conn.:

First, I claim the construction of boiler sections with partial flues, substantially as set forth.

Second Constructing the ends of said partial flues, with concave flanges or projections, substantially as and for the purpose set forth.

51,449.—Piston Packing.—Simeon Goodfellow, Troy, N. Y.:

I claim the combination and arrangement of the tapering pin, p, formed into screw thread and key square, the lever spring, n, and rings, e f f, all constructed and applied in the manner and for the purpose specified.

51,450.—Horse Rake.—Robert A. Graham, Greensburgh, Ind.:

First, I claim the diagonal rod, C, applied to the end beams, B B, substantially as and for the purpose specified.

Second, I claim the employment or use of the swivel, E, in combination with the rod, C, substantially as specified.

Third, I claim the manner shown of attaching the rake shafts to the end pieces, whereby the rake may be folded, substantially as specified.

[This invention consists in the employment or use of two bent rods, secured diagonally across the end of the rake frame; and in using a swivel joint, whereby, when the rake is revolved, the chain will automatically change its position, so as to be in proper place for drawing the rake forward; and it also consists in a novel manner of connecting the rake shafts with the end pieces and frame, whereby the tines can be turned inward, or toward each other, so as to make a more compact implement when it is desired to store away the same.]

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51,451.—Bung-hole Reamer.—Lyman Gray, Pittsburgh, Pa.:

I claim a tapering hollow pod, D, open at the top, or largest end, when said large end, or open top, is surmounted by an arch, B, and socket for supporting the handle in the manner shown, and in combination therewith, the use of the scale of figures on the outside of the pod, and sliding gage attached thereto, operating substantially as represented, for the purposes herein set forth.

51,452.—Clothes Mangle.—Joseph B. Greenhut, Chicago, Ill.:

I claim the combination of the central roller, B, driven by hand crank, and provided with the clamp, S, with the circular series of smaller rollers provided with their spring adjustments, substantially as described and represented.

51,453.—Register for Street Cars.—Joseph B. Greenhut, Chicago, Ill.:

First. I claim the combination of the handle, I, and disk, J, with the ratchet, L, pawl, K, shaft, E, and hand, F, arranged as described for registering upon the dial, C, in the manner explained.

Second, In combination with the above, I claim the arrangement of the gearing, O P, shaft, Q, and hand, R, for registering upon the dial, D, in the manner and for the purpose specified.

Third, I claim the combination of the locking bolt, S, spring, V, and hole, U, for preventing the movement of the hand, R, when the latter has completed its movement upon its dial.

Fourth, I claim the combination of the rack, a, pawl, b, claw, c, lever, d, and pin, e, with the hammer, X, substantially as and for the object set forth.

51,454.—Valve Gear for direct-acting Steam Engines.—William H. Guild and William F. Garrison, Williamsburg, N. Y.:

First, I claim the cylinder, M, with ports, q q' and n n', communicating with the main valve chest and exhaust pipe and its two contained pistons, N N', having ports, m m', and connected with the valve, C, by means of the two arms, I I', of the rock shaft, E, the whole arranged and operating substantially as herein specified.

Second, In connection with the pistons, N N', and the valve, C, connected by the arms of a rock shaft, E, running through the valve chest, we claim the lever, F, oscillating loosely on the said rock shaft, connected with the main piston rod, and furnished with projections, t t', operating on the toes, S S', of the rock shaft, all substantially as herein described.

51,455.—Grate Bar.—Warren E. Hill, Brooklyn, N. Y.:

I claim the longitudinal space, E, in combination with the transverse air passages, G, and adapted to allow the ascent of air between the sides, M and N, and its discharge into the spaces at the sides of the bars, substantially in the manner and for the purpose herein specified.

51,456.—Tire-upsetting Machine.—Hiram L. Howard, Mendon, Mich.:

I claim the combined arrangement of the clamping and upsetting jaws, A B, cam lever, M L, anti-friction roller, R, and stays, S S, constructed and connected substantially as described, and the several parts arranged relatively with each other, and with the bench plank, C, or other bed sill, in the manner and for the purpose herein specified.

51,457.—Thill Coupling.—James W. Innis, Milroy, Ind.:

I claim a thill coupling for wheel vehicles, composed of an eye, E, in which the thill iron, F, secured by a pin, b, the eye being provided with a pendant rod, D, which is fitted in a protuberance, C' on a clip, A, and secured therein by a spring catch, G, substantially as and for the purpose set forth.

[This invention consists in attaching the thill to the axle in such a manner as to obtain a firm and secure coupling, and one which will admit of the thills being very readily attached to and detached from the axle.]

51,458.—Machine for Cutting Wood Gear.—James Jackson, Woonsocket, R. I.:

I claim, First, The combination of the pivoted arms, G G, reciprocating slides, L, rotary cutters, S, and belt, T, arranged and operating substantially as and for the purposes specified.

Second, The combination of the adjustable bars, H U, and screw rods, I V, with the pivoted arms, G G, as and for the purposes set forth.

[This invention relates to a new and improved machine for cutting wooden teeth for bevel gears, whereby the work may be done in an expeditious and perfect manner, and the machine adapted for cutting teeth to suit wheels of different diameters.]

51,459.—Method of Preparing Gold for Dental Purposes.—E. G. Kearsing, New York City:

I claim a cake prepared from gold foil, substantially as and for the purpose described.

Also, preparing gold for dental purposes, by beating it out in thin leaves, and grinding or cutting it up in combination with molasses, honey or other suitable materials, substantially as herein set forth.

[This invention consists in beating the gold into fine leaves, and molding it into a cake by squeezing or other mechanical means, or, instead of this, it may be cut up in fine pieces and mixed with honey, molasses, or other suitable adhesive substance, and in this state formed into cakes of the required size and weight.]

51,460.—Washing Machine.—Patrick Killin, Mount Healthy, Ohio:

I claim, First, The adjustable washboard composed of parts, E F, and spring, f, constructed as above described and for the purpose set forth.

Second. The endless belt, e, comprising bars, d, driving drums, D, constructed as shown and for the purpose set forth.

Third, The adjustable washboard, B, in arrangement with endless belt, e, and compressing bar, d, as described, and for the purpose set forth.

51,461.—Car Coupling.—George L. Kitson, Philadelphia, Pa.:

I claim the combination of the sliding catch, B, with the spring, D, in connection with the pin, C, and groove, I, in said pin, C.

51,462.—Coloring and Polishing Wood.—E. Knabeschuch, New York City:

I claim coloring and polishing woods with aniline colors, substantially in the manner described.

51,463.—Animal Trap.—Sylvanus Knight, Adel, Iowa:

I claim the arrangement of the case, A, furnished with the openings, e and 12, door, p, glass, x, and grooves, 13, pieces, b c and o, door, m, tread, d, trigger, i, spring, t, drums, r and s, cord or chain, F, pins, 1 and q, and index 1 2 3 4 5 6 7 8 9, etc., when used in connection with the wheel consisting of axle, n, and wings, y, the whole being constructed, arranged and operating substantially as herein described, and for the purpose set forth.

51,464.—Machine for Punching Paper for Telegraphs.—Marshall Lefferts, New York City:

First, I claim the escapement pawl, 14, operating substantially as specified in combination with the revolving friction pulley, 2, and shaft, g,''' for the purposes and substantially as specified.

Second, I claim the bent lever, 17, and connection, 15, to the escapment, 14, in combination with the keys, E, for the purposes and substantially as specified.

Third, I claim revolving the type wheel and shaft by a friction pulley, substantially as specified.

51,465.—Wrench.—J. Parker Lindsay, New Haven, Conn.:

I claim making the bar, B, of the wrench with a rib, spline or feather, on its back edge or side, substantially as herein described and set forth.

51,466.—Skate.—John Lovatt, Newark, N. J.:

First, I claim dividing the foot rest of a skate in the direction of its length into two parts or sections, which parts are so connected or attached to the supports therefor of the skate, that they can be either moved toward or away from each other, substantially in the manner described and for the purposes specified.

Second, In combination with the above, constructing or forming the outer edges or peripheries of the foot-rest sections and at suitable points thereof, with raised clamps, g g, substantially as and for the purpose described.

Third, In combination with the longitudinally divided skate foot-rest, having side clamps, g g, of the fixed rest, pin or stud, G, for the front of the boot or shoe heel, substantially as and for the purpose specified.

51,467.—Lock.—L. H. Mayott, Springfield, Mass.:

First, I claim in combination with a suitable case, A B F G, the parts, D E H, and pins, a b c d, when arranged and operating substantially in the manner and for the purposes described.

Second, Providing the plate, H, with one or more holes, m n o p, for the purpose of fastening the lock when the pins are pushed too far down as herein set forth.

51,468.—Bottom for Ice Cream Freezer.—Edward M. Manigle, Philadelphia, Pa.:

I claim the herein described tinned, decarbonized, cast iron bottoms for ice cream freezers as a new article of manufacture.

51,469.—Sash Fastener.—Jacob B. Masser, Sunbury, Pa.:

First, I claim the wedge-shaped serrated bolt, E, occuping a recess of similar shape in the case, D, and operating as described by employment on the sash to restrain its downward movement.

Second, I claim the arrangement of the locking wedge, E, in its combination with the shoulder of the recess, H, in the sash and the projection, I, of the case, D.

51,470.—File Holder.—W. C. McGill, Cincinnati, Ohio:

I claim as an improved article of manufacture, a file holder made and operating substantially as herein set forth.

51,471.—Machine for Starching and Glazing Cords, Braid, Etc.—Donald McInroy, New York City. Antedated, Dec. 9, 1865:

First, I claim the convoluted pipe, p, forming a dryer to the fabric drawn through between the pipes, as and for the purposes specified.

Second, I claim the hollow dryer, d, and ironer, e, applied as and for the purposes set forth.

Third, I claim the winding-up reel, i, actuated by the pulleys and regulated by the friction strap as specified.

51,472.—Grate.—Peter Murrey, Milwaukee, Wis.:

I claim the combination of the supporting bars, D D, and rocking bars, E E, operating substantially as and for the purpose described.

51,473.—Combined Horse Rake and Hay Spreader.—George N. Palmer, Greene, N. Y.:

First, I claim the combination and arrangement of the adjustable rear rake, H, in combination with the stationary rake head, I, and vibrating frame, F F, for spreading or tedding hay, operating as herein described for the purpose set forth.

Second, I claim the spring bumpers, m m, in combination with the balance frame, F F, and the cams, e e e, on the rotating axle, c, for operating the tedding apparatus, substantially as and for the purposes specified.

51,474.—Pump.—F. S. Pease, Buffalo, N. Y.:

I claim the elastic air chamber with its internal expanding spring, in combination with the arrangement of valves and passages, substantially as described.

51,475.—Operating Ordnance.—Charles Perley, New York City:

First, I claim the mode herein specified of elevating a gun or mortar from behind a breast work or protection previous to its discharge and the lowering of the same previous to loading, by a hydraulic ram and cylinder as specified.

Second, I claim a hydraulic recoil check, consisting of a plunger acting against liquid in a chamber, from which chamber there is an opening or escape substantially as specified.

Third, I claim projecting the gun forward by the pressure of a liquid upon a ram or plunger, substantially as specified.

Fourth, I claim adjusting or sighting a gun by means of hydraulic pressure acting upon a ram or plunger in a chamber, substantially as specified.

Fifth, I claim elevating the charge or projectile, by a ram or plunger acted on by hydraulic pressure, substantially as specified.

Sixth, I claim connecting the chamber in which the recoil plunger acts with the hydraulic cylinder substantially as specified, so that the pressure of liquid in the latter shall force the gun forward as set forth.

51,476.—Hinge.—E. N. Porter, Morrisville, Vt.:

I claim the arrangement and combination of the block, J, arms, G, and spring, K, substantially as described and for the purposes set forth.

51,477.—Weather Prophet.—A. C. Rand, Union Mills, Pa.:

I claim the use of the reed, a, or a hygrometer plant, in combination with the umbrella, C, and figure, A, arranged and operating substantially as and for the purpose herein shown and described.

[This invention consists in the application to a human figure of the reed of a hygrometer plant, in combination with a miniature umbrella which is connected to said reed and to the figure in such a manner that when the atmosphere is dry, the umbrella is turned down to the side of the figure, and when the atmosphere is wet the umbrella is turned up over the head of the figure, and by these means the state of the weather is indicated in a reliable manner.]

51,478.—Centering Circular Saw.—W. T. and L. H. Rand, N. H.:

I claim in centering circular saws, the combination of radial pins suspended in slots cut in their arbors with a taper-pointed screw or its equivalent in the end of the arbor, substantially as shown.

51,479.—Fruit Slicer.—James H. Reed, Kent County, Del.:

I claim the combination of the hollow mandrel, A, the movable knives and the collar, F, constructed and operating substantially as described and represented.

51,480.—Process for Preserving Eggs.—Richard S. Rhodes and Ebenezer Whyte, Chicago, Ill.:

We claim the herein described process for preserving eggs from decay and preserving their vitality, substantially as specified and set forth.

51,481.—Steering Apparatus.—Price W. Robinson, New Bedford, Mass.:

I claim, First, The parallel fixed, T-shaped guide bars for the travelling nuts, arranged substantially in the manner described.

Second, The knuckle jointed connecting arms, t, when used in combination with the revolving nuts working above the head of the rudder post, substantially as described.

51,482.—Cane Stripper.—Horace Rockwell, Roanoke, Ind.:

I claim the instrument as and for the purpose described.

51,483.—Scissors Sharpener.—James J. Russ, Worcester, Mass.:

I claim First, The adjustable polygonal shaped sharpener plate, d, in combination with any suitable stand therefor arranged together and operating substantially in the manner described and for the purpose specified.

Second, The combination with the polygonal sharpener plate secured to a suitable stand of the adjustable guide, p, arranged together so as to be adjusted with regard to each other and to the stand substantially in the manner described and for the purpose specified.

[This invention relates to a novel and very useful implement for the sharpening of scissors, shears, and other similar cutting instruments, and consists in so securing upon one side of a suitable stand an adjustable polygonal or other suitable shaped sharpener-plate that its edge will project above the top of the said stand, either more or less, according to the position in which it is set, in combination with which sharpening plate and upon and across the top of the stand is a raised guide for the scissors when its blade is drawn across the edge of the sharpening plate, which guide is also susceptible of adjustment therein, whereby it and the sharpener plate can be set to correspond with the bevel of the cutting edges of scissors, etc., be it more or less.]

51,484.—Shingle Machine.—Samuel T. Sanford, Fall River, Mass.:

I claim, First, Giving to each saw or gang of saws, a lateral motion by guides m m', or their equivalents, substantially as and for the purpose described.

Second, The use of two gangs of saws in one and the same sash, one in front and the other in the rear, substantially as and for the purpose set forth.

[This invention relates to a machine in which two gangs of saws are used in one and the same sash, one in front of the other, in combination with slotted guides, one for each saw or for each gang of saws, in such a manner that by the action of said guides the front saws are caused to act in one, and the rear saws in another direction, thus producing two kerfs which intersect at an acute angle, and cutting a block of wood up in a number of shingles equal to the whole number of saws, less one, provided said block is thick enough to be acted upon simultaneously by the whole number of saws in the gate.]

51,485.—Combined Filter and Cooler.—Louis Scharff, Spring Mill, Pa.:

I claim the vessels, A and A', connected by the tube, a, having the inlet pipe, b, and outlet, d, perforated partitions, E, and filtering media, x x x x, all combined and arranged as herein described.

51,486.—Horse Rake.—D. P. Sharp, Ithaca Township, N. Y.:

I claim the combination of the eyes or sockets, d d d, with the metallic plates, c, and coiled teeth, E, all arranged to operate as and for the purposes specified

I further claim the stops, d', when used in connection with the teeth applied to the rake head, substantially as and for the purpose specified.

[This invention relates to a new and useful improvement in horse rakes, and of that class in which wire teeth are used. The invention consists in a novel manner of attaching the teeth to the rake head, whereby an independent movement is allowed each tooth, and the teeth at the same time secured to the head in a firm and durable manner.]

51,487.—Suspended.

51,488.—Padlock.—Thomas Slaight, Newark, N. J.:

I claim the sliding bolt, C, in combination with a spring or springs, E, and one or more tumblers, D, pivoted to the bolt and provided with hooked ends, g, which are arranged in such relation with the eye of the shackle, and the rear or opposite ends arranged in such relation with the stump, b', to operate in the manner substantially as set forth.

[This invention relates to an improvement on a padlock, for which Letters Patent were granted to this inventor, bearing date Oct 14, 1851, and in which a bolt, tumblers, and springs are combined in such a manner that the springs will sustain both the tumblers and bolt in place, and carry them forward when drawn back by the key in unlocking, and also turn the shackle out when unlocked, and permit it to lock again without a key. The present invention consists in an improved arrangement of the tumblers, one or more, with bolt and springs, as hereinafter described, whereby the tumblers are made to serve as a more efficient guard or check than heretofore, and the lock rendered more difficult to pick or open illegimately.

51,489.—Burglar Alarm.—B. L. Stone, New York City:

I claim, First, Constructing the clamp, H, with a hinge joint, to enable it to be folded up close against the back or side of the case, substantially as specified.

Second, The device, E j k l m, or its equivalent, for holding the rod from operating after the clock work has been wound up, and while the alarm is being set

Third, In combination with the above, the shaft, f, connected to the rods, e and h, arranged substantially in the manner and for the purposes herein mentioned.

51,490.—Horse Hay-fork.—Grove F. Strong, Onondaga, N. Y.:

I claim, First, A horse hay-fork, suspended by a simple bail without braces, held in working position by latches at the ends of the fork head, substantially as shown.

Second, In combination with the bail or handle of a horse hay fork, the latch bolts, g, constructed and operating substantially as shown.

Third, in combination with the bail or handle of a horse hay-fork, the lever, k, with the cross head, i, and connections, l, for the purpose of withdrawing the latches and liberating the fork.

Fourth, In combination with a horse hay-fork, the hooks, o o, and ring, p, for the purpose of enabling the trippling cord to be used as a guide rope, substantially as described.

51,491.—Basket Machine.—J. B. Sweetland and E. C. Goodrich, Pontiac, Mich. Antedated Dec. 5, 1865:

We claim, First, The employment of spring catcher, a a a, used in connection with the head, D, substantially as and for the purpose herein specified.

Second, The employment of the adjustable staff or standard, B, when the same is used in the manner and for the purpose specified.

51,492.—Heater for Skates.—Owen W. Taft, New York City:

First, I claim so constructing the heating chamber and combining it with the foot plate that access can be had to its interior without removing the foot from the foot plate, as and for the purposes set forth.

Second, The rim or flange, a, extending all round the edge of the foot plate, substantially as and for the purpose described.

Third, The arrangement of the lamp, C, and heater, D, in combination with the heating chamber, B, and foot plate; A, constructed and operating substantially as and for the purpose specified.

51,493.—Bed-bug Trap.—Wm. Tapper, New York City:

I claim the arrangement and use of a braided frame made of split willow, or its equivalent, for the purpose of acting as a trap to catch bed bugs, in the manner substantially as described.

51,494.—Cultivator.—J. H. Thomas, P. P. Mast, and Thos. Harding, Springfield, Ohio:

First, We claim the independent short axles, E, provided with the projection, F, and secured to the main axle, B, in the manner shown and described.

Second, The combination of axles, E, rods, c, and lever, I, as shown and described.

Third, We claim the lever, G, in combination with the lever, I, rods, c, and axles, E, arranged and operating as set forth.

51,495.—Grain Separator.—Andrew J. Vandegrift, Cincinnati, Ohio:

First, I claim the attachment of wings to a fly wheel, in such a manner as to form a fan and fly wheel, in combination, having the same set of arms and hub in common, thus constituting, in combination, a device to perform the double office, acting as a regulator of motion, or distributor of power, and, at the same time constituting an efficient exhaust fan, constructed in the manner and used for the purpose substantially as set forth.

Second, Peculiarly constructed lever, U, shaft, K, wheels, f f, shaft, L, or their equivalents, when located at the mouth or lower end of flue, N, in such a manner as not to form a material obstruction to the air rushing into said flue, and to transmit motion to dish or disk, M, or its equivalent, without the necessity of extending a shaft up through tube, Q, when arranged in the manner and for the purpose substantially as set forth.

Third, Case, T, thumb screw, h, cross head, g, connecting rods, S S, when arranged in hopper, p, in the manner and for the purpose substantially as set forth.

Fourth, Crank, A2, shaft, B, wheel, C, pinion, D, shaft, E, combined fan and fly wheel, F, pulley, H, pulley, I, bearing, U, shaft, K, gear wheels, f f, shaft, L, plate or disk, M, curb, O, feed tube, Q,

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slip joint, R, with connection rods, S S, cross head, g, thumb screw, h, and case, T, all arranged relatively with each other, combined and operated in the manner and for the purpose set forth.

51,496.—Steam Engine.—Lawriston Towne, Providence, R. I.:

I claim regulating the velocity of steam engines by combining a variable steam port with a liberating valve gear, substantially in the manner described.

51,497.—Pruning Knife.—L. O. Vaughan and P. W. T. Vaughan, De Kalb, Ill.:

We claim the link, C, and friction rollers, e e, in combination with the cutting blade, B, bed plate, A, and lever, a a, substantially as herein shown and described.

[This invention consists in a novel arrangement of a cutting blade on a suitable bed plate, which has its outer end of a hooked shape, to receive the twig and retain it during the cutting operation.]

51,498.—Lock.—R. Vollschwitz, New York City:

I claim the case, C, with the mechanism for locking and unlocking, in combination with the lock plate, A, and bolt, B, all constructed and arranged substantially as and for the purpose described.

51,499.—Chalk Holder for Billiard Tables.—Henry M. Wall, Niles, Mich.:

I claim an improved deviee for holding chalk for billiard tables, and other purposes, consisting of the stock, A, provided with a suitably formed socket, B, in combination with the clamp holder, f, and adjusting screw, m, substantially as set forth.

51,500.—Machine for Raking and Bunching Hay.—Lorenzo Wallace, Leavenworth City, Kanzas:

First, I claim the rake, C, in connection with the endless elevating apron, I, and cleavers, U, placed or arranged in a mounted frame, substantially as and for the purpose set forth.

Second, The receiver, J, suspended or hung upon pivots, when used in connection with the rake, C, and elevating apron, I, substantially as and for the purpose specified.

Third, The arranging of the rake, C, in the manner shown, and connecting it with a lever frame, G, substantially as and for the purpose set forth.

Fourth, The beating device, composed of the bar, M, provided at one side with a rack, s, and having the cross bars, t t, at its lower end, in connection with the frame, N, and slide, Q, attached to lever, O, and operated from one of the supporting wheels of the machine, substantially as and for the purpos specified.

Fifth, The discharger. J', applied to the machine underneath the receiver, J, having straps, m, attached, connected with levers, and arranged so as to operate in connection w th the receiver, substantial y as and for the purpose set forth.

[This invention relates to a new and improved machine for raking up and stacking hay in the field, and is designed to economize in the labor of harvesting hay.]

51,501.—Window Shade.—James W. Ward and Stephen D. Wilson, Richmond, Ind.:

We claim the construction of a window shade in which the slats or strips are formed of converging surfaces, producing edges, as and for the purposes set forth.

51,502.—Manufacture of Sugar.—H. Weller and J. E. Hatcher, Fultonham, Ohio:

First, We claim the passing the sirup, as the same leaves the evaporator or boiler, through a series of boxes or coolers, substantially as herein described, so that it is divested of the gum mixed with it previous to its admission to the granulating boxes.

Second, The combination and arrangement of the evaporator, B, cooler, C D, one or more, and granulating boxes, E, sucstantially as and for the purpose set forth.

[This invention is designed to facilitate the manufacture of sugar from Northern canes, and is apparently a simple and economical device for the purpose.]

51,503.—Horse Rake.—M. D. Wells, Morgantown, West Va.:

I claim the bar, F, attached by a spring, G, to the cross bar, H, of the thills, B B, and provided with a rod, I, at its rear end, in combination with the lever, c, all arranged and applied to the rake to operate substantially in the manner as and for the purpose set forth.

[This invention relates to a new and useful improvement in that class of horse rakes which discharge their load by a revolving movement, and it consists in the employment or use of a simple attachment for controlling or regulating the turning of the rake.]

51,504.—Apparatus for Ventilating Ships.—Oliver D. Wells, Westerly, R. I.:

First, I claim the interior tight skin, C D, arranged relatively to the timber framing, A, and to the tight planking or outer skin, B, substantially in the manner and for the purpose herein set forth.

Second, I claim the tight partitions, J, formed in the sides of a vessel, substantially in the manner and for the purpose herein set forth.

Third, I claim the air ways c, between the parts, D and A, arranged relatively to each other, and to suitable means of receiving and discharging the atmospheric air, substantially in the manner and for the purpose herein set forth.

Fourth, I claim the passages i, formed longitudinally above and below the deck of a vessel, substantially in the manner and for the purposes herein set forth.

Fifth. I claim the air ways, E F, and valves, M N, mounted in a vessel, and arranged relatively to each other and to suitable passages for the movement of air through the frame work of the vessel substantially in the manner and for the purposes herein set forth.

51,505.—Corn Harvesters.—John S. Williams, Chicago, Ill.:

I claim the combination and arrangement of the box, U, the hinged tail piece, X, the arm, W, and foot lever, V, substantially as and for the purposes specified and described.

51,506.—Machine for Spliting Wood.—William L. Williams (assignor to himself and Thomas J. O'Conner), New York City:

I claim the rollers, l l, applied to each side of the knives in splitting fire wood, in the manner and for the purposes specified.

51,507.—Machine for Cutting Stalks and Stubble in the Field Preparatory to Plowing.—George W. Wilson, Galesburg, Ill.:

First, I claim the lifting and dropping of the knife, C, alternately by means of a series of rollers, a a, and the elongated or other similarly constructed springs, D D, substantially in the manner and for the purpose as herein set forth.

Second, I claim the arrangement of the lever, F, and hook g, in combination with the rollers, a a, for throwing out of gear or disengaging the springs, to which the knife, C, is attached, from the rollers, substantially in the manner and for the purposes as herein set forth.

51,508.— Suspended.

51,509.—Clothes Sprinkler.—E. T. Colburn (assignor to himself and William P. and Isaac Gannett), Boston, Mass.:

I claim the clothes sprinkler, herein described, the same consisting of a water reservoir provided with hollow valve, stem or tube, arranged so as to operate substantially in the manner specified.

[This invention relates to a novel hand device or implement to be used for sprinkling clothes previous to being ironed, and it consists in combining with a closed vessel or reservoir for the water employed, having one of its ends finely perforated, a hollow valve stem or tube, so arranged therein that by opening the valve the vessel can be filled with water, the air escaping therefrom through its hollow stem or tube, when the valve being closed and so held, by depressing its stem with the thumb or finger of the hand in which the implement is held, the escape of the water from and the entrance of air to the vessel is prevented, the water, when so desired, by simply shaking the vessel with the hand, then being thrown out of the same either in greater or lesser quantities, according to the force with which it is shaken.]

51,510.—Steam Generator.—James Connery (assignor to himself and William G. Pennypacker), Wilmington, Del.:

I claim the cylinder, D, with vertical pipes, E, and radiating pipes, b, in combination with the fire box, B, shell, A, annular water space, C, and heating tubes, e, constructed and operating substantially as and for the purpose described.

51,511.—Burglar Alarm.—A. W. Deerow (assignor to Edmund Hoole), Brooklyn, N. Y.:

I claim the tripping bolt, B, so arranged with reference to the striking mechanism as to operate in either a vertical or horizontal direction, substantially as herein set forth, for the purpose specified.

51,512.—Connecting Rod Couplings.—Hiram S. Dodge, Lockport, N. Y., assignor to J. W. Doty:

I claim the connecting rod coupling, composed of the spring jaws or straps, I, provided with conical pintles, D D, fitting into corresponding sockets, H H, in the strap or bar, B, the adjusting bolt, E, and latch, G, all constructed and arranged and applied as herein described.

51,513.—Composition Pavement.—Daniel C. Heller (assignor to himself and B. Frank Boyer), Reading, Pa.:

I claim a composition pavement, formed by combining plaster of paris, litharage, coal tar, lime, sand, and broken stone or equivalent, substantially in the manner herein described, and for the purpose set forth.

[The object of this invention is to furnish a composition pavement that will be dry, hard, not liable to be injured by heat or frost, and that will be water tight; and it consists in forming the foundation or lower layer of the pavement of broken stone, cemented together by coal tar and lime, and in forming the surface dressing of sand coal tar, litharge, and plaster of paris. Each layer being closely packed and leveled by passing over it a heavy roller before the cement has had time to set.]

51,514.—Mop Head,—Peter R. Higby, Buffalo, N. Y., assignor to himself, William Smith, and Erastus W. Clark, Westmoreland, N. Y.:

I claim the combination of the frame, A B B, and the pivoted loop, C, constructed and operating substantially as described and represented.

51,515.—Funnel.—Charles Jones (assignor to himself and Charles Hodgetts), Brooklyn, N. Y.:

I claim a funnel struck up in dies from a single piece of metal and having a plane marginal surface adjoining the upper edge, and flutes or corrugations increasing in depth from the top downward, as herein described.

[This invention relates to an imported funnel of that class which are provided with corrugated or fluted ends or nozzles to admit of the escape of air from the vessel while being filled by means of the funnel.]

51,516.—Spring for Bedsteads.—David Manuel, Newton, Mass. (assignor to himself and William Manuel), Boston, Mass.:

I claim the combination as well as the arrangement of the eye, B, and the conoidal or conical spring, A, substantially as specified and as represented.

51,517.—Caliper.—Benjamin G. Martin (assignor to Benjamin G. Martin, Thomas M. Davis, Lloyd H. Walton, and Watson Sandford), Philadelphia, Pa.:

I claim the application of a plumbing bar, C, to a pair of calipers, having feet, b' b2, constructed so as to form a straight line with each other when in contact, as and for the purpose described.

51,518.—Mash Tun for Brewers.—Benjamin G. Martin, Philadelphia, Pa., assignor to himself, Thomas M. Davis, L. H. Walton, and Watson Sandford. Antedated Nov. 30, 1865:

First, I claim the case, A B, hopper, C, shaft, D, and paddle wheels, F F, the same being constructed and arranged to operate together, in combination with the rakes, E E, or their equivalents, substantially as and for the purpose specified.

Second, I claim the sparger, G, in combination with the supply pipe, g', or its equivalent, and the hopper, C, the same being constructed and arranged to operate together substantially as and for the purpose described.

Third, I also claim the application of distributing paddles, H H, to the shaft, D, the said paddles being constructed and arranged to operate below the case, A B, as and for the purpose described, when the mixing machine herein described is placed directly over any suitable mash-receiving tun, as described.

51,519.—Welt Trimmer.—John B. Reed (assignor to himself and David R. Tyler), Warren, Mass.:

I claim the welt trimmer, made substantially as described, viz: with the bevelled blade, B, having the cutting edge, a, guard, b, and the rasp, arranged on it and provided with a shank and handle, as explained.

51,520.—Paper and Letter File.—Homer Riggs (assignor to himself and William Church), Oxford, Conn.:

I claim the herein-described metallic letter file, made adjustable as to extend, substantially as and for the purpose specified.

51,521.—Steam Generator.—James Samuels (assignor to himself and George W. Otis), Lynn, Mass.:

First, I claim the partition stays, J, arranged between the compartments, A, substantially as and for the purpose described.

Second, The combination and arrangement of the rings, B and I, compartments, A, rods, E E, and nuts, F F, substantially as and for the purpose described.

51,522.—Pump.—C. A. Stillman (assignor to C. B. Cottrell and Nathan Babcock, Westerly, R. I.:

First, Making the valve chamber, C, and valve box, B, of tapering form, in contradistinction to the form of a true cylinder, so that the wear of the box, will be compensated, substantially as described.

Second, Forming a water space between the larger head of the valve box, B, and the adjacent end, h, of the valve chamber, C, substantially as and for the purpose above set forth.

Third, hinging the valves on the upper or higher sides of their seats, substantially as and for the purpose above set forth.

51,523.—Mode of Raising Railroad Tracks.—James Temple (assignor to himself and H. P. Hottenstein), Selinsgrove, Pa.:

I claim, First, The combination of the vibrating rack bar, D, with the rack or pinion bar, E, constructed and operating substantially as described, for the purpose set forth.

Second, the combination of said parts, D and E, with pinion wheels, F, and frame, C B, operating conjointly to produce the result above mentioned.

51,524.—Lock for Coats, Etc.—Charles B. Trimble (assignor to himself and Charles T. Allen), New York City. Antedated Nov. 30, 1865:

First, The safety coat lock herein described, the same consisting of a chain fixed at one end to and upon the wall or other suitable place, in combination with a suitable locking or holding device having the general features herein specified, the two being arranged and operating together substantially in the manner set forth.

51,525.—Scoop and Flour Sifter.—George S. Wendell (assignor to J. Horace Taylor), New York City:

I claim a combined scoop and sifter when arranged with the handle, C, located as described, having the shield plate, H, behind the wire screw, F, and with the hooks or rests, D', attached to said plate, H, substantially as set forth for the purpose mentioned.

51,526.—Lantern.—William Westlake, Chicago, Ill., assignor to Cross, Dane, and Westlake:

I claim connecting the body or lamp part of the lantern to the guard, by means of the ring or rod of the guard and the spring catches or their equivalent, substantially as and for the purposes herein set forth.

51,527.—Die for Making Railroad Crossing Points.—Hugh Baines, Manchester, Eng.:

I claim constructing and operating dies, in the manner substantially as set forth, for the purpose of making railroad points.

51,528.—Preserving Timber.—Alexander Hamar, Hungary, Empire of Austria:

I claim preserving timber from decay, insects, and other destructive agents, by means of a solution prepared substantially as herein described, and applied in the manner herein set forth.

51,529.—Device for Reefing Fore and Aft Sails.—John Sunderland, Eng.:

I claim, First, The combination of the boss or socket, a, pin jaws, c d, and chain, k, with the boom or gaff, as and for the purposes specified.

The guard, m, in combination with the chain passing round the boss or socket at the fore end or throat of the boom or gaff, as set forth.

Third, The combination of the travelers, r, with the mast hoops and sail, as and for the purpose described.

51,530.—Penman's Assistant.—William King, Hopewell, New Brunswick:

I claim an apparatus for supporting the arm while writing, composed of an arm plate, A, bar, B, and wrist pad, E, substantially in the manner herein shown and described.

Also the arrangement of the bracket, C, in combination with an arm plate, A, and bar, B, as set forth.

Also the spring, f, arranged under the bar, B, substantially in the manner and for the purpose specified.

Also the combination of the spring g, with the wrist pad, E, substantially as and for the purpose described.

[This invention relates to a device for supporting and steadying the arm and body of a person while writing, said device being so arranged that it forms bearing points principally for the bony and neutral parts of the head and arm, leaving the muscles, blood vessels, and nerves connected with the movements of the pen, free from pressure or congestion.]

51,531.—Process for Smelting Iron.—Frederick Lang, Vienna, Austria, and Charles Augu t Frey, Storre, Styria:

We claim the process substantially as herein described of preparing certain refractory ores and scoria cinders, produced in the manufacture of iron, preparatory to and facilitating the reduction thereof, as described.

51,532.—Spinning Wheel.—J. M. Flood, Fulton, Mo.:

I claim, First, the arm, M, pivoted to the bench, A, at, x, in combination with the treadle, O, the belt or cord, P, the wheels, N d and d', and weight, W, the whole constructed, arranged, and operated as described and set forth.

Second, I claim, the crank, E', the wheels, D F F'', H H' and I, the belts, D', G and L, and the spindle, K, when combined and arranged as and for the purpose as set forth.

REISSUES.

2,124.—Machine for Pointing Wire.—Orin L. Hopson and Heman P. Brooks, Waterbury, Conn. Letters Patent No. 43,772. Dated Aug. 9, 1864:

We claim, First, A divided die, fitted and actuated substantially as specified, and operating by a series of compressions upon the article to be formed, to give to such article a smooth round shape, corresponding to the shape of the dies, as set forth.

Second. We claim the adjustable radial cams, k, in combination with the jaw, d, shaft, b, and dies, i, substantially as specified.

Third, We claim a divided die, in which round or cylindrical articles of metal are compressed, in combination with a screw or equivalent device to regulate the opening of the die, and the consequent amount of each successive reduction, as set forth.

2,125.—Sewing Machine.—John Bachelder, Norwica, Conn. Patented May 8, 1849. Extended seven years. Reissued Sept. 22, 1863:

First, I claim, in combination, the supporting bed which supports the material horizontally in the machine, and is provided with a throat for the passage of the needle, and the constant yielding pressure holder, each having the functions and mode of operation hereinbefore specified.

Second, I claim, in combination, the supporting bed, the constant yielding pressure holder, and the reciprocating eye-pointed needle, each having the functions and mode of operation hereinbefore specified.

Third, I claim, in combination, the supporting bed, the constant yielding pressure holder, and the reciprocating needle carrier each having the functions and mode of operation hereinbefore specified.

Fourth, I claim, in combination, the supporting bed, the yielding pressure holder, the reciprocating eye-pointed needle, and the perpetual feed which moves the material horizontally under and past the needle while it is supported by the supporting bed, each having the functions and mode of operation hereinbefore specified.

Fifth, I claim, in combination, the supporting bed, the yielding pressure holder, the reciprocating needle carrier, and the perpetual feed which moves the material horizontal y upon and over the supporting bed, each having the functions and mode of operation hereinbefore specified.

Sixth, I claim, in combination, the holding surface which supports the material immediately about the needle horizontally under the thrust of the needle, and the perpetual feed which moves the material horizontally under and past the needle upon and over such holding surface, each having the functions and mode of operation as hereinbefore specified.

Seventh, I claim, in combination, the holding surface which supports the material immediately about the needle horizontally under the thrust of the needle, the perpetual feed which moves the material horizontally under and past the needle upon and over such holding surface, and the receiving plate which receives the material from the feed during the operation of the machine in sewing a seam, each having the function and mode of operation hereinbefore specified.

Eighth, I claim, in combination, the horizontally holding surface immediately about the needle, the perpetual feed, the receiving plate, and the yielding pressure holder, each having the functions and mode of operation hereinbefore specified.

Ninth, I claim, in combination, the horizontally holding surface immediately about the needle, the perpetual feed, and the yielding pressure holder, each having the functions and mode of operation hereinbefore specified.

Tenth, I claim, in combination, the horizontally holding surface immediately about the needle, the perpetual feed, the yielding pressure holder, and a reciprocating eye-pointed needle, each having the functions and mode of operation hereinbefore specified.

Eleventh, I claim, in combination, the horizontally holding surface immediately about the needle, the perpetual feed, the yielding pressure holder, and the reciprocating needle carrier, each having the functions and mode of operation hereinbefore specified.

Twelfth, I claim, in combination, the receiving plate, and the perpetual feed, each having the functions and mode of operation hereinbefore specified.

Thirteenth, I claim, in combination, the horizontally holding surface immediately about the needle, the perpetual feed, and the reciprocating needle carrier, each having the functions and mode of operation hereinbefore specified.

Fourteenth, I claim, in combination, the perpetual feed, the receiving plate, and the yielding pressure holder, each having the functions and mode of operation hereinbefore specified.

DESIGNS.

2,228.—Burial Case.—Martin H. Crane and Samuel A. Traugh, Cincinnati, Ohio.

2,229, 2,230.—Cooking Stoves.—Conrad Harris and Paul W. Zoiner, Cincinnati, Ohio.

2,231.—Arch of a Letter Press.—Francis Hovey, New York City.

2,232.—Advertising Carriage.—Oliver F. Sage, Bostor Mass.

2,233.—Statuette.—George Starkey, New York City.

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